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# Active System Manager Solution Guide

## Active System 200 for VMware

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*Version 7.1*



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## Introduction to the Active System 200 Solution

Today, many IT organizations are missing deadlines or cannot respond fast enough to customer demands, have insufficient IT budgets, or have to manage trade-offs. In response, convergence in the data center has emerged as a trend in IT to address the growing needs for agility, efficiency, and quality. IT organizations are rapidly adopting converged infrastructure solutions to lower the cost of running critical workloads, enable faster infrastructure deployments, and drive simplicity and speed of management.

Below are some high-level solutions for the Dell™ Active System (AS) 200:

**Rapid and Simple Scalability**—The Dell AS 200 is a part of the Active Infrastructure family, which includes fully pre-integrated converged infrastructure solutions. As one of the pre-integrated solutions offered, the Dell Active System 200 is a scalable rack servers and storage infrastructure designed to support private cloud infrastructures. Able to add compute and storage capacity as needed in a non-disruptive manner, the Active System 200 offers many different configuration options for varying business conditions and sizes for a highly utilized IT infrastructure.

**Quick and Easy Provisioning**—The Dell Active System 200 allows for more rapid application deployments through minimized design, test, procurement, integration, and configuration phases. One key feature of the Active System 200 is the Active System Manager, which offers streamlined, automated processes, as well as a quick response to dynamic business needs through template-based, modular infrastructure provisioning. This allows IT infrastructures to achieve higher efficiencies and more accurate delivery of IT services. A single IT generalist can manage most common tasks via the streamlined and automated processes delivered through the Active System Manager.

**Automated and Efficient**—The Dell Active System 200 enables your data center to reach its maximum potential, and reduces the complexity and amount of time spent manually managing storage functions through automation for a more efficient and simplified management. This allows the Dell Active System 200 to support the efficient, agile delivery of applications and IT services made possible by a private cloud infrastructure, delivering true IT as a service through private cloud benefits such as self-service portals and chargebacks.

This document describes the deployment and management of Active System Manager 7.1 on Active System 200 infrastructures.



## Technical Documentation

The Dell Active System Manager documentation enables you to better understand your current Active Infrastructure, its deployment, and management software.

For this release, we recommend that you familiarize yourself with the following documentation:

- Active System 200 Spec Sheet
- Active System 200 VMware ESX 5.x Reference Architecture
- Active System Manager 7.1 User Guide
- Active System Manager 7.1 Web Interface User Guide

To access the latest Active System Manager documentation for Version 7.1:

1. Navigate to [www.dell.com/support/manuals](http://www.dell.com/support/manuals) and select **Choose from a list of all Dell products**.
2. Click **Continue**.
3. Click **Software and Security > Enterprise System Management > Active System Manager > Dell Active System Manager Version 7.1**.

## Overview

This section provides a high-level product overview of the Active System supported components and configurations.

Table 1 lists the Active System Manager solution for the Active System 200-supported components.

**Table 1.** Active System 200-Supported Components

Component	Details
VMware vSphere 5.1 Hypervisor	Minimum 3x and maximum 7x Dell PowerEdge R720 Server and embedded VMware vSphere 5.1 <ul style="list-style-type: none"> <li>• 1x Broadcom 5720 Quad port 1Gb Network Daughter Card (rNDC)</li> <li>• Broadcom 57810 Dual port 10Gb NIC (Add-in Card)</li> </ul>
Converged Fabric Switch	<ul style="list-style-type: none"> <li>• 2xDell Force10 S4810</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• Minimum 1x and Up to 4x Dell EqualLogic PS6110 series arrays</li> </ul>
Management Infrastructure	<ul style="list-style-type: none"> <li>• 2x Dell PowerEdge R620 servers with embedded VMware vSphere 5.1 hosting management VMs.</li> <li>• 1x Dell Force10 S55 used as a 1Gb out-of-band management switch</li> </ul>
Management components hosted in the management infrastructure	<ul style="list-style-type: none"> <li>• Active System Manager</li> <li>• EqualLogic SAN HQ</li> <li>• OpenManage Essentials with Repository Manager</li> <li>• Microsoft Windows Server 2012 with Hyper-V Role enabled (200m)</li> <li>• Customer provided or trial version of Microsoft System Center 2012 SP1 Virtual Machine Manager (200m)</li> <li>• VMware vCenter Server (200v)</li> <li>• Dell Management Plugin for vCenter (200v)</li> <li>• VMware vCloud™ Connector (200v)</li> <li>• Compellent Plugin for VMware vCenter (200v)</li> </ul>

Table 2 lists the Active System Manager solution for the Active System 200-supported configurations.

**Table 2.** Active System 200-Supported Configurations

Configuration	Support
Dell PowerEdge R720 Servers	Support firmware images as per the Active System Manager solution for Active System 200  <b>NOTE:</b> Add on NICs must be in slot 2 to successfully run orchestrations.
Dell Force10 Top-of-Rack (ToR) S4810 switches	Supported FTOS and base configuration will be packaged in the virtual appliance. The base configuration should be updated for management IP and virtual LAN (VLAN) per data center deployment need.
Dell EqualLogic PS6110 Storage Array	Supported firmware versions will be packaged in the virtual appliance.
VMware vCenter 5.1 for virtual machine (VM) workloads	Supported ESXi 5.1 image will be bundled in the virtual appliance
ESXi 5.1 installation support on rack servers	

## Active System Manager Deployment

This section describes the options, prerequisites, and methods to deploy Active System Manager.

### Deployment Options

The Active System Manager solution for Active System 200 is packaged as a virtual appliance and is made available for VMware vCenter 5.1 and the Windows Server 2012 System Center Virtual Machine Manager (SCVMM); see Table 3:

Open Virtualization Format (OVF) for VMware—disk format is VMware virtual machine disk (VMDK).

Hyper-V virtualization environment—disk format is virtual hard disk (VHD) for Hyper-V.

**Table 3.** Deployment Options

Virtual Appliance Filenames	Platform
Dell-ActiveSystemManager-7.1.0.xyztp_VMware.zip	VMware vCenter 5.1
Dell-ActiveSystemManager-7.1.0.xyztp_Microsoft.zip	Microsoft Server 2012 with Hyper-V

## Deployment Prerequisites

Before using the Active System Manager solution for end-to-end provisioning of Active System 200 components, make sure that the prerequisites listed in Table 4 are in place.

**Table 4.** Deployment Prerequisites

Specification	Prerequisite
Connection requirements	Active System 200 units connected per the Active System 200 <i>Reference Architecture and Design Guidelines</i>
Management server requirements	Management server is configured per the Active System 200 <i>Reference Architecture and Design Guidelines</i>
Firmware and BIOS requirements	All equipment must be configured with firmware versions as listed in section  Appendix B—Firmware and Software Base Lineup
For the Active System 200 R720 Servers:	<ul style="list-style-type: none"> <li>R720 Servers are configured and have the management IP address and login credentials assigned</li> </ul> <p><b>NOTE:</b> The username (<b>root</b>) and password required..</p>
Force10 S4810 switches (Top-of-Rack [ToR])	<ul style="list-style-type: none"> <li>The management IP address is configured for the ToR switches.</li> <li>The A200 base configuration is applied on both switches.</li> <li>VLANs are created on the switches per the Active System 200 deployment specification.</li> <li>The virtual machine (VM) traffic VLANs will be created dynamically by Active System Manager.</li> </ul>
EqualLogic Storage Array	<ul style="list-style-type: none"> <li>The group IP and management IP are configured for Storage Array.</li> <li>All storage array members are added to the group.</li> </ul>
VMware vCenter 5.1	<ul style="list-style-type: none"> <li>vCenter 5.1 is configured and accessible via the management and hypervisor management network.</li> <li>Appropriate licenses are deployed on the vCenter.</li> </ul>
PXE Setup for server deployment	<ul style="list-style-type: none"> <li>Details for deploying PXE Server are listed in section Appendix F—PXE Setup Requirements. This setup is needed for PXE boot of the servers only.</li> </ul>

## Deploying OVF

The Active System Manager Open Virtualization Format (OVF) can be imported on to an ESXi host using the VMware OVF import process. When booted, the Active System Manager VM get its IP address from an existing DHCP server. If the DHCP server is not configured, assign the IP address manually to the appliance.

### Importing OVF from the vSphere Client

1. On the vSphere Client menu, click **File** → **Deploy OVF Template**.
2. Browse to the OVF file (*Active-System-Manager-7.x-Build-xxxxx\_VMware.ovf*) and click **Next**.
3. In the **Name** field, enter the VM name and click **Next**.
4. Select the appropriate datastore name where the VM must be hosted.
5. Select the disk format. (Thin provisioning is supported and recommended.)
6. Select the network name.  
The VM must be mapped to the Hypervisor Management Network. All networks (for example, OOB, Hypervisor Management, vMotion, iSCSI, and VM workloads) are expected to be accessible from the appliance.
7. Use the following necessary key access credentials.

**Table 5.** Key Access Credentials

VM Access Credentials	Username/Password
Active System Manager server installation login	delladmin/delladmin
Active System Manager server root	root/Dell@123
Active System Manager application	admin/admin

## Changing Key Access Credentials

Passwords should be changed at the time of deployment. You should change the passwords before creating or changing any of the software repositories.

1. Stop Active System Manager services:
  - a. Log in as user **delladmin** (see Table 5).
  - b. Execute following commands:

```
cd $HOME/asm-galeforce/gf/sbin
```

```
./stopasm.sh
```

Make sure that all of the services are stopped before continuing.

2. Change the passwords using the standard Linux command `passwd` to change the passwords for any of the three stock accounts.
  - o root
  - o delladmin
  - o oracle

You will need root access to modify the passwords. Run the following commands:

```
su
```

```
<Enter root password>
```

```
passwd delladmin
```

```
<Enter new password>
```

```
<Re-enter new password>
```

3. Repeat these steps until all three user accounts have been modified.

**IMPORTANT:** Do not rename the user accounts, only change their passwords.

4. Reboot your Active System Manager VM.

After you have changed your passwords you must reboot your Active System Manager VM.

Before you reboot, make any other changes such as IP address or time (NTP) configurations and then reboot once to encompass all of your changes.

5. Update any already existing software repositories that are running on the Active System Manager appliance.

Most of your software repositories depend on credentials to be able to access firmware, ISO files, PXE boot files, etc. If the passwords are changed as part of an initial deployment, there will be fewer repositories to update with the new credentials. If you change passwords on an Active System Manager server that has been in use for a while, you may have many more repositories to update.

## Assigning IP Address to the Active System Manager Appliance

1. On the vSphere or Hyper-V Manager client, select the deployed **Active System Manager** appliance and open its console.
2. Log in as the **root** user. Root user credentials are given Key Access Credentials.
3. Navigate to **System**→**Preferences**→**Network Connections** to launch the Network Connections wizard.
4. Select the network interface card (NIC) appliance on which IP address should be configured manually and click **Edit**.
5. On the **Editing** dialog box, click the **IPv4 Settings** tab. Select **Manual** for the **Method**.
6. Click **Add** and enter the IP address and other networking information (for example, DNS). Click **Apply**.

7. Open the terminal console by clicking **Applications** → **System Tools** → **Terminal**.
8. Execute the following command:  

```
/etc/init.d/network restart
```
9. Log in to the appliance with the newly configured IP address. This will ensure that the IP address is configured correctly on the appliance.

## Accessing the Active System Manager Web Client for the First Time

To access the Active System Manager web client, perform the following steps:

**NOTE:** If you are trying to access the Active System Manager for the first time, you must have a valid license to log on to the Active System Manager web portal.

1. In your internet browser, enter the following URL:  
**http://<your server name>:<Active System Manager port number>**  
  
The copyright information displays and after a few seconds, the **Please Sign In** page displays.
2. In the **Please Sign In** page, enter the delladmin Username (admin) and Password (admin), and click **Sign In**.  
  
**NOTE:** The administrator can use the admin /admin factory-supplied default credentials. Using these default credentials, the super administrator can create multiple administrators.
3. In the License Deployment page, copy and paste the content of the license file provided in the License File text box. Click **Submit** to log on to the Active System Manager.

## Adding Additional Licenses

To add a license:

1. Perform one of the following procedures:
  - To add a license using the web client, click **Settings** → **License** on the menu bar.
  - To add a license using thick client, click **Tools** → **Settings** on the menu bar, and click the **License** tab.

The License screen displays the current licensing information and associated live (current) counters.

2. Optional. In the License screen, click the **Refresh** icon to refresh the resource count and view the currently-allocated resources.
3. Click **Get New License**. The next license screen allows you to request and deploy or install a new product license.
4. In the Request Product License section, click **NOW** and enter the following contact details:
  - First name
  - Last name (optional)
  - Email address
  - Company name
  - Group or organization name



5. Click **Send Email** to send an email (support@dell.com) to the Dell Support team, requesting a product license.

The Dell Support team responds to your software license request with a license file.

6. In the Deploy Product License section, copy and paste the content of the license file provided in the License File text box.
7. Click **Submit**.

## Configuring Active System Manager Services

The following sections describe how to start, stop, and verify Active System Manager services.

### Starting Services

The appliance is configured to start Active System Manager services during start-up. To start the services manually:

8. Log in as user **delladmin** (see Table 5).
9. Execute following command:

```
cd $HOME/asm-galeforce/gf/sbin  
  
./startasm.sh
```

**NOTE:** The Active System Manager services must not be started by user **root**.

### Stopping Services

To stop the services manually:

10. Log in as user **delladmin** (see Table 5).
11. Execute following command:

```
cd $HOME/asm-galeforce/gf/sbin  
  
./stopasm.sh
```

### Verifying Service Status

To verify that all Active System Manager services are running:

12. Log in as user **delladmin** (see Table 5).
13. Run the following script to display the current status of all services, including the Oracle database status:

```
cd asm-galeforce/gf/sbin  
  
./asmstatus.sh
```

Figure 1. Sample Active System Manager Services Status Output

```
Active System Manager Service
-----
Host: asm-galeforce Port: 40500 Secure Port: 50500
Enterprise: Dell
Lab: DEMO
Status: Running

Domain Services
-----
1. Domain      : System (Id: 1)
   Description:
   -----
   Session server
       Host: asm-galeforce Port: 40500 Secure Port: 50500
       Status: Running
```

## Installing the Active System Manager Client

You can install the Active System Manager Client on the following platforms:

- Installing Active System Manager Client Software on Windows
- Installing Active System Manager Client Software on Mac
- Installing Active System Manager Client Software on Linux

### Installing Active System Manager Client Software on Windows

1. Download the Active System Manager installer, x64 version should be downloaded for x64 OS and x32 should be downloaded for x32 based OS.
2. On your desktop, click **Start** → **Run** → **Browse**, navigate to the `setup.exe` file, and click **OK**. Alternatively, from your Windows Explorer window, navigate to the `setup.exe` file and double-click it.  
A Security Warning window prompts you to run the file.
3. Click **Run** and complete the installation wizard.

**NOTE:** If an existing version of the client is on the client machine, invoking the installer prompts you to select to uninstall the existing version already on the system. Once selected,

the installer uninstalls the existing version and then exits. Restart the installer to install the new version.

4. Click **Finish** to complete the installation process.

### Installing Active System Manager Client Software on Mac

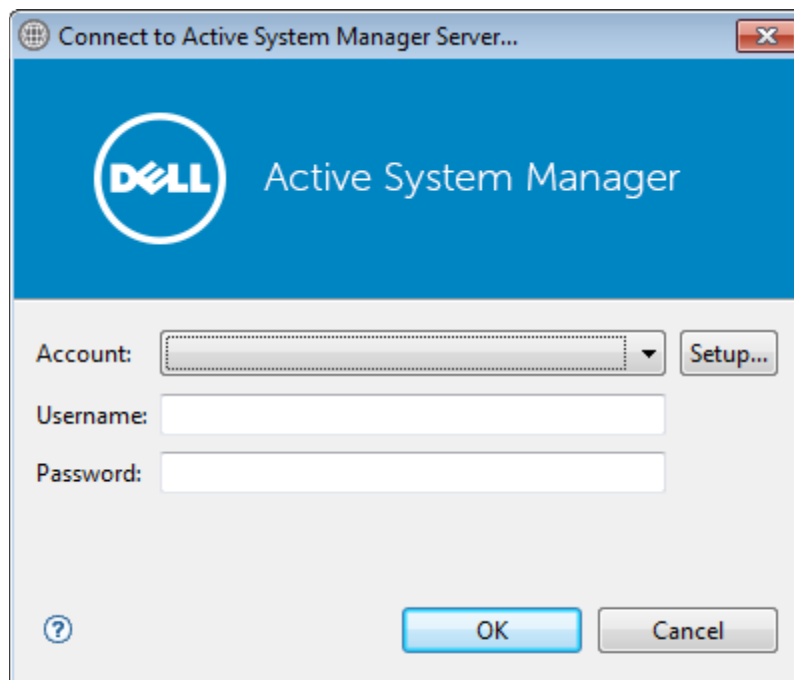
1. Download the **ActiveSystemManager-macosx.x86\_64\_7.1.0\_xyzt.zip** file.
2. Unzip the file into a specific folder destination on your hard drive.
3. Create an Active System Manager folder and move the file contents to this location.
4. Execute the **Active System Manager.app** file.

### Installing Active System Manager Client Software on Linux

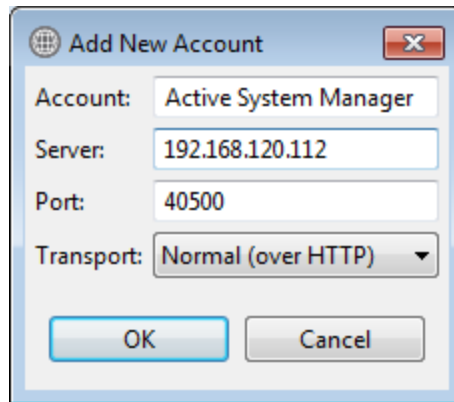
1. Download the **ActiveSystemManager-linux.gtk.x86\_64\_7.1.0\_xyzt.zip** file.
2. Unzip the file into a specific folder destination on your hard drive.
3. Create an Active System Manager folder and move the file contents to this location.
4. In the console, execute the **Active System Manager** file.

### Accessing Active System Manager Using the Windows Client Software

1. Launch the client software application.
2. On the **Connect to Active System Manager Server** dialog box, click **Setup**.



3. On the **Setting Up Accounts** dialog box, click **Add**.
4. Enter a unique and descriptive **Account** name for the account and **Server IP** address of the appliance.



5. Click **OK**.
6. Select the account created earlier.
7. Enter the username and the password for the appliance. The default username and password is **admin/admin**.
8. Click **OK** to launch the Active System Manager application.

## Active System Manager Setup

This section describes the steps to manage and deploy the rack server s in the Active System 200.

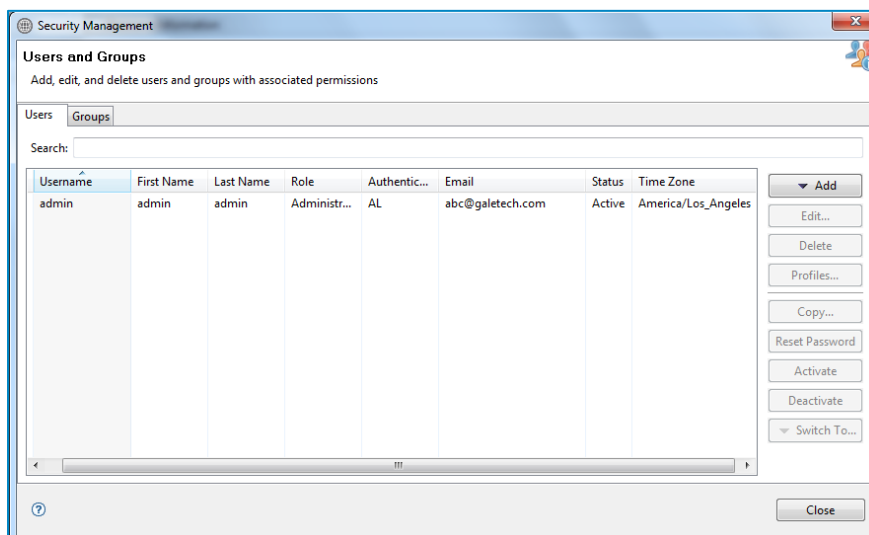
### User and Group Management

You can manage users and groups within the Active System Manager by either entering individual users or groups, or by importing users from an external repository, such as Lightweight Directory Access Protocol (LDAP), Active Directory (AD), or Network Information Service (NIS).

For user management, log in to the Windows client and navigate to **Tools → User and Groups**. The **Security Management—Users and Groups** dialog box displays.

**NOTE:** Set the time zone to match the time on the workstation that the Active System Manager client is installed.

Figure 2. Security Management—Users and Groups



For details on user and group administration, see the “User Profile Management” chapter in the *Active System Manager User Guide*, which is downloadable from the Active System Manager 7.1 web portal (**Help** menu) or from the Thick client (Eclipse-based).

## Discovering Active System 200 Components

Discovery of the Active System 200 components includes:

- Dell R720 Server Rack servers
- Force10 Top-Of-Rack (ToR) S4810 switches
- Dell EqualLogic Storage Array
- VMware vCenter Server components

### Initiating Discovery

To initiate the Discovery process, perform the following tasks in this order:

- Opening the Discovery
- Adding Details for the Active System
- Adding vCenter System Properties
- Starting the Discovery Process

### Opening the Discovery Settings

1. Connect to the Active System Manager Client using user credentials with Administrator privileges.
2. Select **Tools** → **Discovery** → **Setup**.

### Adding Details for the Active System 200 Unit

**NOTE:**

- In general for all the devices, when defining names and provisioning parameters, you should avoid using the following special characters: @ # \$ % ^ ( ) + = " | } { [ ] . , | : ; " ' ? / > <
- The volume names of the Dell EqualLogic Storage Array can contain only alphanumeric characters, and the following special characters: colon (:), period (.), and dash (-).
- When discovering a POD, the value for the AssetTag cannot contain any of the strings in the following names: Dell, Force10Switch, EqualLogicStorageArray, VMware, or Host. For example, AssetTag cannot have a value of "Storage" as this value matches exactly with a string in "EqualLogicStorageArray".

To add details for the Active System 200 unit, click **Add System**. This feature displays names for Active System 200 components that will be discovered; for example:

- Dell R720 Servers
  - Dell EqualLogic Storage Array
  - Dell Force10
1. Select the individual components and provide the required IP address/login credentials.

**Assettag**—Required. Unique key or name used to import or identify the Dell PowerEdge R720 Servers within Active System Manager. For example Assettag Dell\_R720\_001 (a unique name) can be used to track the rack servers in Active System Manager

**Username**—Username to access and manage the Dell PowerEdge R720 Server.

**Password**—Password to access and manage the Dell PowerEdge R720 Server.

**IP Address**—Required. IP address for the Dell PowerEdge R720 Server . The Server should be IP reachable from the Active System Manager server.

2. Provide the following element properties for the Dell EqualLogicStorageArray system:

**Assettag**—Required. Unique key or name for the EqualLogic Storage Array, which is used to import or identify an EqualLogic Storage Array in the Active System Manager. For example, Assettag Dell\_EqualLogic\_PS6100\_1 (a unique name) can be used to track the EqualLogic array in Active System Manager.

**Username**—Group username to access and manage the EqualLogic Storage Array.

**Password**—Group password to access and manage the EqualLogic Storage Array.

**IP Address**—Required. Group Management IP address for the EqualLogic Storage Array. Group Management IP should be reachable (via ping to test) from the Active System Manager server. Group IP of the EqualLogic Array should be IP reachable from the Active System Manager server.

**NOTE:** If there are multiple storage groups, there should be an entry for each of the Storage Group in the **Discovery Configuration Setup** view. To add a new element in an existing Active System 200 unit, click **Add Element**, select **Dell EqualLogicStorageArray**, and provide required details to initiate discovery.

3. For Dell Force10 Switch (ToR) discovery, provide the following element properties and discovery attributes:

**Assettag**—Required. Unique key or name for Dell Force10 Switch which is used to import or identify the Force10 Switch in Active System Manager. For example, Assettag Dell\_Force10-S4810\_1 (a unique name) can be used to track the Force10 Switch in Active System Manager

**Username**—Username to manage the Force10 switch.

**Password**—Password to manage the Force10 switch.

**IP Address**—Required. Management IP address for the Force10 switch. This should be IP reachable from the Active System Manager server.

- o **Role**—(Optional) Top/Bottom.
- o **SupportedVLANIDs**—VLAN IDs that could be provisioned on the Top-Of-Rack (ToR) switch. Sample input format (2..1024); the switch supports a VLAN range from 2 to 1,024.
- o **Terminal Server IP Address**—Optional. Required if switch to manage is using the Terminal Server port.
- o **Terminal Server Port**— Optional. Required if switch to manage is using Terminal Server port.
- o **Terminal Server Username**—Optional. Terminal Server username (if configured)
- o **Terminal Server Password**—Optional. Terminal Server password (if configured)

### Adding vCenter System Properties

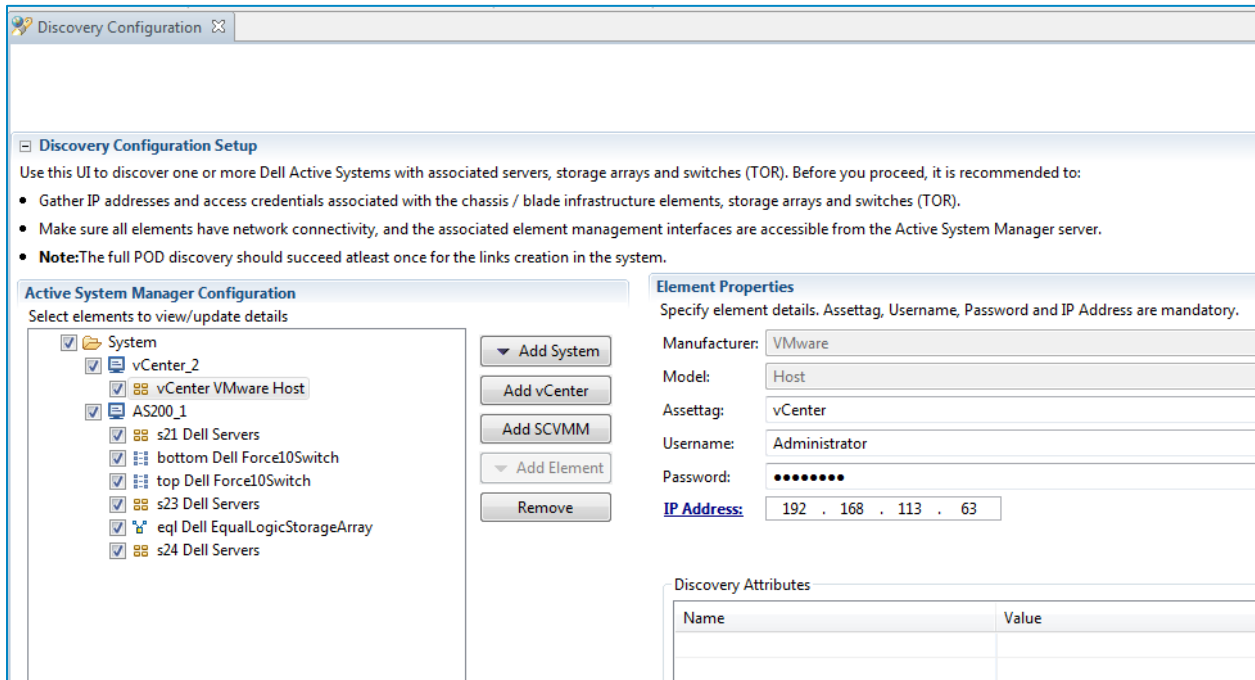
1. On the Active System Manager → **System** → vCenter configuration, click **Add vCenter**.
2. For VMware vCenter discovery, provide the following system properties:

**Name**—Unique key or name for VMware vCenter which is used to import or identify vCenter in the Active System Manager.

**Username**—Username to access and manage the vCenter. This user must have full administrator rights to the vCenter. If the vCenter Server is part of a Windows Domain, then enter the username as **username@domain**.

**Password**—Password to access and manage the vCenter.

**IP Address**—IP address for the vCenter application. This must be IP reachable from the Active System Manager server.

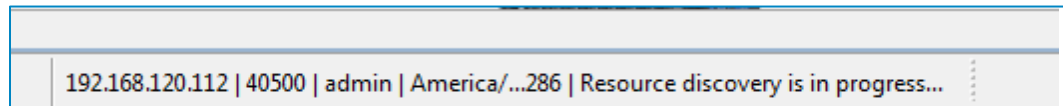


### Starting the Discovery Process

1. Connect to the Active System Manager Client using user credentials with Administrator privileges.
2. On the menu bar, click **Tools** → **Discovery** → **Start**, which initiates the discovery process for components that were set up during the discovery configuration setup.

**NOTE:**

- You can view the discovery progress from the task bar shown at the bottom of the client.



- If the discovery progress is initiated when a discovery process is already in progress, the Active System Manager user is prompted with a message, indicating the same.



## Configuring Server Inventory

After completing the Active System 200 components discovery, update the following information manually for all rack servers. These parameters will be used for configuring the ESXi Server with appropriate information (for example, IP Address, hostname, iSCSI IP Address).

This information can be updated by using the multi-editor feature or by opening individual server instances. You can launch the multi-editor by selecting multiple server instances and right-clicking **Open with Multi-Editor**.

The following parameters must be updated for ESXi deployment:

- **EsxiSCSIChapUsername**—iSCSI Chap username used to access volume of EqualLogic Storage Array
- **ESXiSCSIChapSecret**—iSCSI Chap secret corresponding to iSCSI Chap username.
- **ESXServerHostname**—Hostname to be assigned to the ESXi server.
- **ESXServerPassword**—Server root password to be assigned during unattended installation.

## Software Repositories Available in the Active System Manager Virtual Appliance

The following repositories are pre-packaged and available in the Active System Manager virtual appliance:

- Applicable for Dell Servers—“PXE bootable images”, where the repository has the ESXi PXE bootable installer image already configured and “ISO bootable images” where the ESXi ISO bootable installer image is available.
- Applicable for Dell EqualLogic Storage—EqualLogic Storage Firmware.
- The repository has EqualLogic firmware images configured (EqualLogic Storage Resource Pools)
- ToR Switch Configurations and Images—The repository has switch images and a base configuration configured.
- VMware ESXi images

### Updating Repository Elements for Firmware Images on EqualLogic Firmware Repo

The EqualLogic StorageArray repository contains firmware images to be used for updating the firmware on EqualLogic Storage Arrays.

1. Open the **Software Repositories** view in the setup perspective by clicking **Setup** → **Software Repositories** on the client.
2. In the **Software Repositories** view, right-click and select **Repositories**.
3. On the **Software Repository—Select Repository Type** dialog box, select **Software Repository** and **Existing**.
4. Select the **Repository Type** from the list and click **Next**.
5. Update the IP address, username, password, and base directory (location on the server where the firmware images are present, it can be the access information for the Active System Manager appliance as appliance is shipped with latest firmware images; otherwise, it can be the access information for the remote server having the firmware images residing on it, the server should be SSH reachable from the Active System Manager appliance) for the image server, and click **Next**.
6. On the **Software Repository—Update EqualLogic Firmware Repository** dialog box, click **Finish**.

**NOTE:** If a new image is added to the appliance, skip step 6.

7. On the **Software Repository—Repository Elements Discovery and Association** dialog box, click **Discover** to display all the firmware images available on the image server.
8. Click **Associate** to associate the image file with the required **Resource Types** (Dell EqualLogic Storage Array and EqualLogic Storage Pool).

9. Select resource types and click **OK**.

## Updating Repository Elements for EqualLogic Storage Resource Pools

The EqualLogic Storage Resource Pool repository contains the information of the Storage Pools available on EqualLogic Storage Arrays.

1. Open the **Software Repositories** view in the setup perspective by clicking **Setup → Software Repositories** on the client.
2. In the **Software Repositories** view, right-click and select **Repositories**.
3. On the **Software Repository—Select Repository Type** dialog box, select **Software Repository and Existing**.
4. Select **EqualLogic Storage Resource Pools** from the list and click **Next**.
5. On the **Software Repository—Update EqualLogic Resource Pool Repository** dialog box, update the **Host**, **Username**, and **Password** parameters. These parameters correspond to storage group Management IP address, group username, group password respectively, and click **Next**.
6. Click **Finish**.

**NOTE:** If a new resource pool is added and information needs to be updated, skip step 6.

7. On the **Software Repository—Repository Elements Discovery and Association** dialog box, click **Discover** to display all the storage pools available on the Storage Array.
8. Right-click the selected Resource Pool and set the Type to **Image File**, and click **Finish**.
9. Click **Associate** to associate the storage pools with the required Resource Types (Dell EqualLogic-PS6110 and EqualLogic Storage Pool), and click **Finish**.

## Updating Repository Elements for PXE Bootable Images

To update these repository elements, perform the following steps:

1. Open the **Software Repositories** view in the setup perspective by clicking **Setup → Software Repositories** on the client.
2. In the **Software Repositories** view, right-click and select **Repositories**.
3. On the **Software Repository—Select Repository Type** dialog box, select **Software Repository and Existing**.
4. Select **PXE Bootable Images** from the list and click **Next**.

The **Update Trivial File Transfer Protocol for PXE Boot** dialog box displays.

5. On the **Software Repository—Update Trivial File Transfer Protocol for PXE Boot** dialog box, update the **Host** attribute value with the IP address of the Active System Manager appliance.

The **Username** and **Password** are configured with default appliance username and password. These need to be updated if the default username/password is updated.

6. Click **Next** to display the list of repository files.
7. Click **Finish**.

**NOTE:** If a new resource pool is added and information needs to be updated, skip step 7.

8. On the **Software Repository—Repository Elements Discovery and Association** dialog box, click **Discover** to display all the repository files. A list of discovered elements appears.

**NOTE:** This step is required only if a new image is added to the repository.

9. Right-click the discovered elements and set the Type to **Image File**, and click **Finish**.

## Updating Repository Elements for ISO Bootable Images

1. Open the **Software Repositories** view in the setup perspective by clicking **Setup → Software Repositories** on the client.
2. In the **Software Repositories** view, right-click and select **Repositories**.
3. On the **Software Repository—Select Repository Type** dialog box, select **Software Repository and Existing**.
4. Select **ISO Bootable Images** from the list, and click **Next**.

5. On the **Software Repository— Update Trivial File Transfer Protocol for ISO Boot** dialog box, update the **Host** attribute value with the IP address of the Active System Manager appliance.

The Username and Password are configured with default appliance username and password. These need to be updated if the default username/password is updated.

6. Click **Next** to display the list of repository files.
7. Click **Finish**.

**NOTE:** If a new resource pool is added and information needs to be updated, skip this step.

8. Click **Discover** to initiate the discovery of the repository files. A list of discovered elements appears.

**NOTE:** Step 8 is required only if a new ISO image is added to the appliance.

9. Right-click the discovered elements and set the Type to **Image File**, and click **Finish**.
10. On the **Software Repository— Update Trivial File Transfer Protocol** dialog box, update the **Host** attribute with the IP address of the VM appliance.
11. Click **Next** to display the list of repository files.

12. Click **Finish**.

**NOTE:** If a new resource pool is added and information needs to be updated, skip step 12.

13. On the **Software Repository—Repository Elements Discovery and Association** dialog box, click **Discover** to initiate the discovery of the repository files. A list of discovered elements appears.

The list of discovered elements in the repository displays.

14. Right-click the discovered elements, set the Type to **Configuration File**, and click **Finish**.
15. Click **Associate** to associate the selected element with the **Dell Force10** resource type and click **Finish**.

## Updating Repository Elements for VMware Baseline Images

This repository contains VMware baseline images for creating VM clones.

1. Open the **Software Repositories** view in the setup perspective by clicking **Setup** → **Software Repositories** on the client.
2. In the **Software Repositories** view, right-click and select **Repositories**.
3. On the **Software Repository—Select Repository Type** dialog box, select **Software Repository and Existing**.
4. Select **VMware Baseline Images** from the list, and click **Next**.
5. On the **Software Repository—Update VMWare vCenter Inventory** dialog box, update the VMware vCenter host (IP address), username, and password.
6. Click **Next** to display the list of repository files.
7. Click **Discover** to initiate the discovery of the repository files. The list of VMs managed by the vCenter displays.
8. Right-click the discovered element, set the **Type** to **Image File**, and click **Finish**.
9. Click **Associate** to associate the selected element with the **VMware VM** resource type, and click **Finish**.

## Configure Networks

Active System Manager manages LAN (private/public), SAN (iSCSI/FCoE), out-of-band management, and hypervisor management networks.

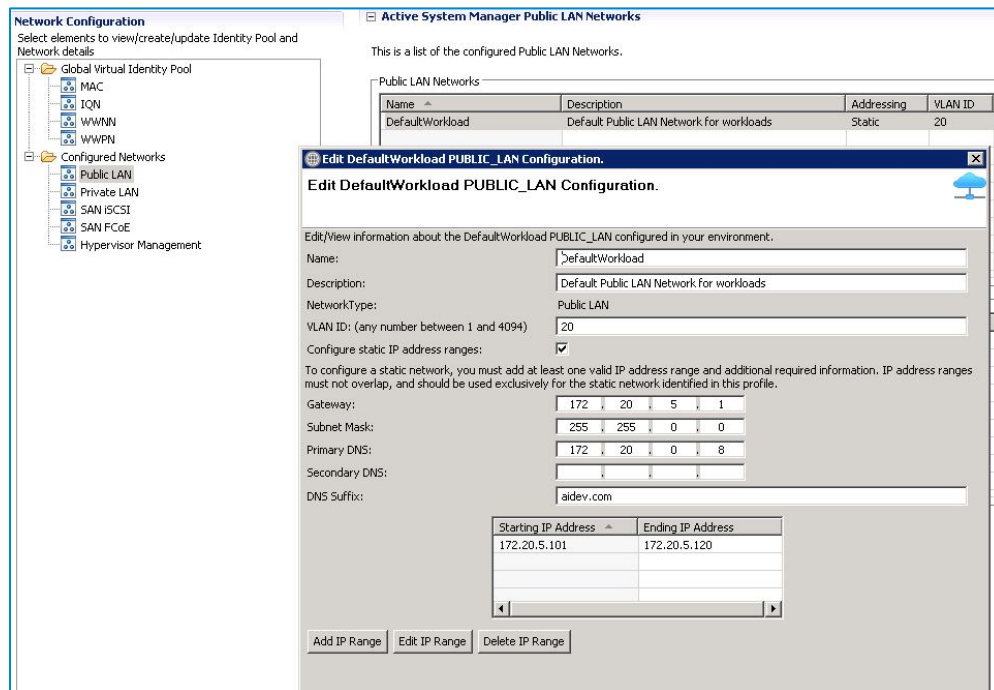
To facilitate network communication, you can add ranges of static IP addresses that Active System Manager will assign to devices for out-of-band management and iSCSI initiators.

You can also create pools of MAC, iSCSI, and FCoE identities that Active System Manager will assign to virtual NICs. For more information about networks, see the *Active System Manager 7.1 User Guide* Chapter 10, "Network Management".

From Setup Perspective → Networking → Configured Networks, enter VLAN id for the default networks:

### Default VM Network

Public LAN → Default VM Network:



## Default vMotion/Live Migration

Private LAN → Default vMotion/Live Migration:

The screenshot displays the 'Network Configuration' interface. On the left, a tree view shows 'Configured Networks' with 'Private LAN' selected. The main area shows 'Active System Manager Private LAN Networks' with a table listing two networks:

Name	Description	Addressing	VLAN ID
DefaultHyperVClusterPrivate	Default Private LAN Network for Microsoft Hyper-V c...	Static	24
DefaultvMotionLiveMigration	Default Private LAN Network for VMware vMotion/ M...	Static	23

An 'Edit DefaultvMotionLiveMigration PRIVATE\_LAN Configuration' dialog box is open, showing the following configuration details:

- Name: DefaultvMotionLiveMigration
- Description: Default Private LAN Network for VMware vMotion/ Microsoft Live Migration
- NetworkType: Private LAN
- VLAN ID: 23
- Configure static IP address ranges:
- Gateway: 172.23.5.1
- Subnet Mask: 255.255.0.0
- Primary DNS: (empty)
- Secondary DNS: (empty)
- DNS Suffix: (empty)
- Starting IP Address Range: 172.23.5.101 to 172.23.5.120

## SAN iSCSI VLAN

SAN iSCSI → Default SAN iSCSI:

The screenshot displays the 'Network Configuration' interface. On the left, a tree view shows 'Configured Networks' with 'SAN iSCSI' selected. The main area shows 'Active System Manager SAN iSCSI Networks' with a table listing one network:

Name	Description	Addressing	VLAN ID
DefaultSANiSCSI	Default SAN iSCSI Network	Static	16

An 'Edit DefaultSANiSCSI SAN\_ISCSI Configuration' dialog box is open, showing the following configuration details:

- Name: DefaultSANiSCSI
- Description: Default SAN iSCSI Network
- NetworkType: SAN iSCSI
- VLAN ID: 16
- Configure static IP address ranges:
- Gateway: 172.16.5.1
- Subnet Mask: 255.255.0.0
- Primary DNS: 172.20.0.8
- Secondary DNS: (empty)
- DNS Suffix: (empty)
- Starting IP Address Range: 172.16.5.101 to 172.16.5.120

## Hypervisor Management

Hypervisor Management → Default Hypervisor Management:

The screenshot shows the 'Active System Manager Hypervisor Management Networks' configuration. A table lists the configured networks:

Name	Description	Addressing	VLAN ID
DefaultHypervisorManagement	Default Hypervisor Management Network	Static	28

The 'Edit DefaultHypervisorManagement HYPERVISOR\_MANAGEMENT Configuration' dialog box contains the following details:

- Name: DefaultHypervisorManagement
- Description: Default Hypervisor Management Network
- NetworkType: Hypervisor Management
- VLAN ID: (any number between 1 and 4094) 28
- Configure static IP address ranges:
- Gateway: 172.28.5.1
- Subnet Mask: 255.255.0.0
- Primary DNS: 172.20.0.8
- Secondary DNS:
- DNS Suffix: aidev.com
- Starting IP Address Range: 172.28.5.101 to 172.28.5.129

Confirm all the networks are static for Hyper-V

The screenshot shows the 'Active System Manager Configured Networks' configuration. A table lists the configured networks:

Name	Description	Type	Addressing	VLAN ID
DefaultHyperVClusterPrivate	Default Private LAN Network for Microsoft Hyper-V c...	Private LAN	Static	24
DefaultHypervisorManagement	Default Hypervisor Management Network	Hypervisor Management	Static	28
DefaultSANiSCSI	Default SAN iSCSI Network	SAN iSCSI	Static	16
DefaultvMotionLiveMigration	Default Private LAN Network for VMware vMotion/ M...	Private LAN	Static	23
DefaultWorkload	Default Public LAN Network for workloads	Public LAN	Static	20



## Server Profiles and Templates

AS200 Active System comes with Default VMWare Server Profile templates. For more information about server templates and profiles, see the *Active System Manager 7.1 User Guide* Chapter 7, "Server Templates and Profiles".

**NOTE:** Active System Manager does not pick up the workload VLAN based on the VLAN ID defined in the Network setting. The workload VLANs are randomly picked up based on the VLAN range defined for the layer 2 switch in the Active System Manager Inventory System. If a specific workload VLAN ID is needed, it should be specified in the VLAN Resource Type → Provisioning settings in the physical template.

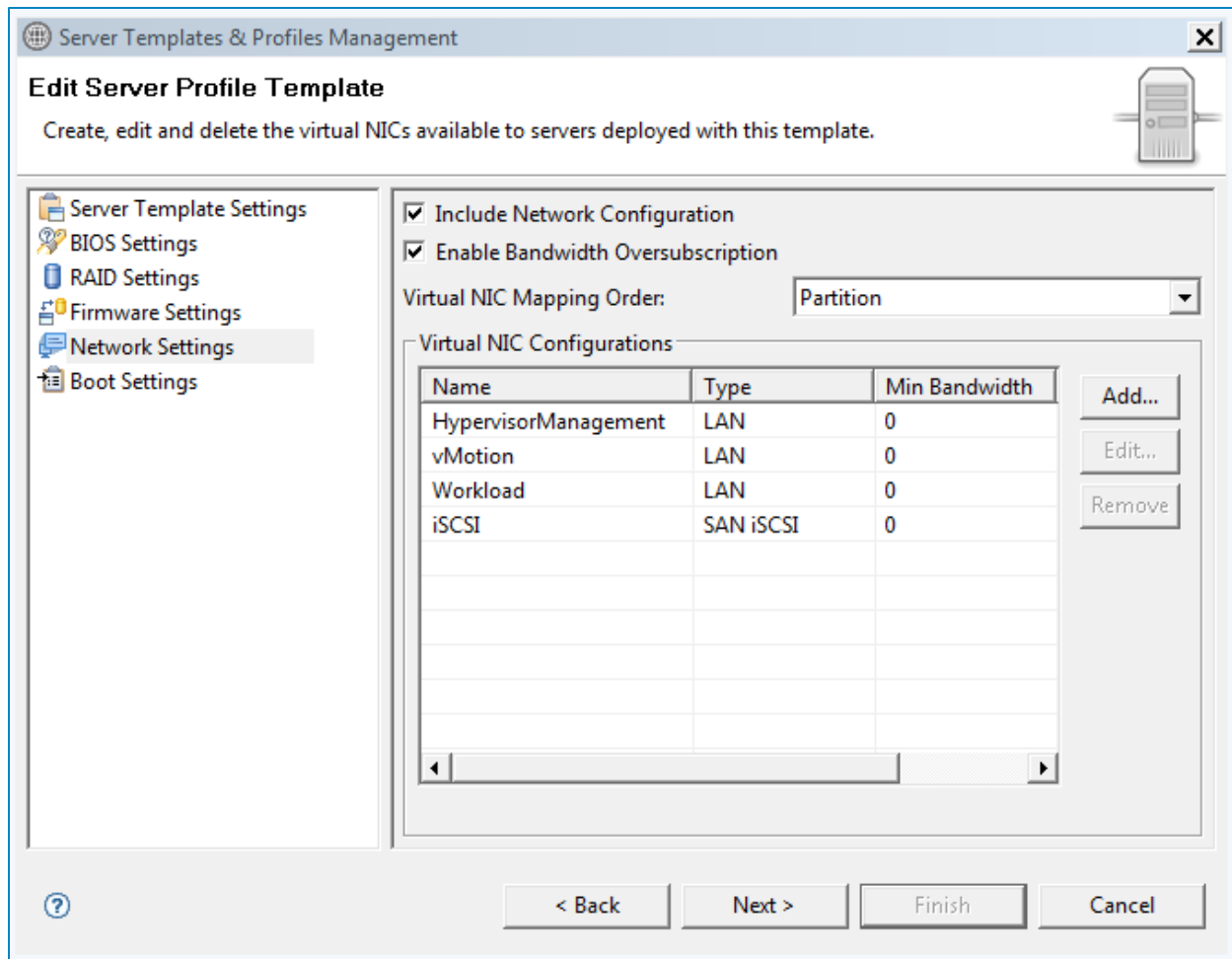
**NOTE:** Attaching more than one Server Profile Template to a physical orchestration template will cause the physical orchestration to fail.

To Create/Modify Server Profile Templates, select Operations and then Server Profiles and Templates.

### VMware Server Template

A server profile template represents a desired configuration of the infrastructure that is being managed. A server profile template is a template that encapsulates how components within a server such as the BIOS, RAID, iDRAC, NIC or Boot order need to be configured. It has references to

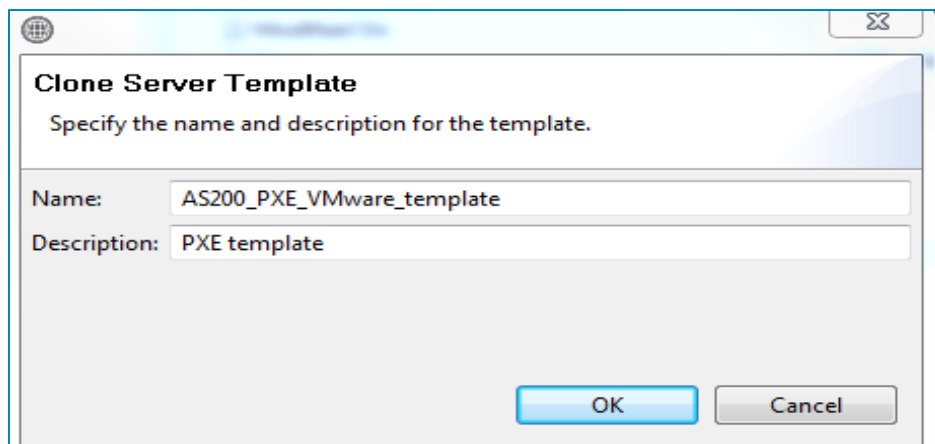
- Server profile template - defines how the server or compute resource should be configured.
- Network profile - defines the networks that the workload should access.
- Firmware version - define a specific firmware that required for this server profile



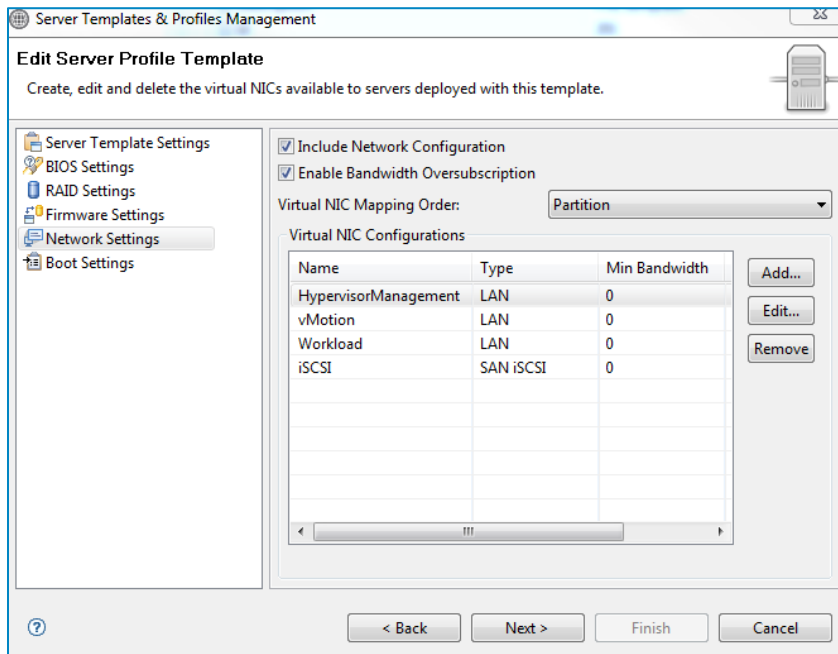
## VMware PXE Server Template

A separate PXE Server Profile template needs to be created before deploying Standalone VMware PXE template.

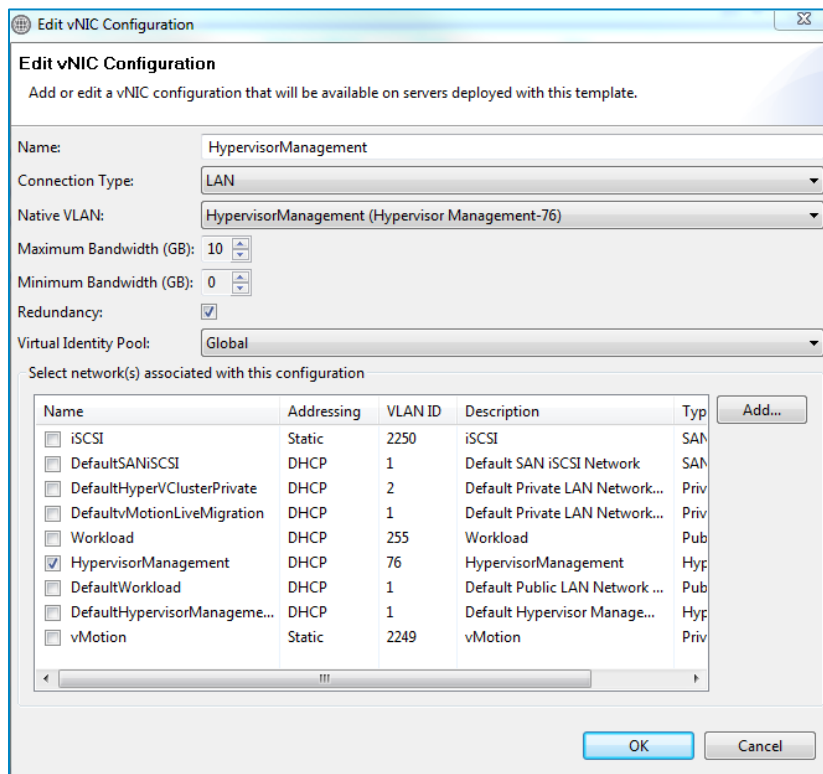
1. Select Operations → Server Profiles → Templates.
2. Right click AS200\_VMware\_template to clone the template.



3. Right-click on **AS200\_PXE\_VMware\_template** and select **Edit**.
4. Go to **Network Settings**, select **Hypervisor Management**, and click **Edit**.



5. Specify the native VLAN (Hypervisor management VLAN) used to PXE boot and click **OK**.



## Physical Templates and Orchestration

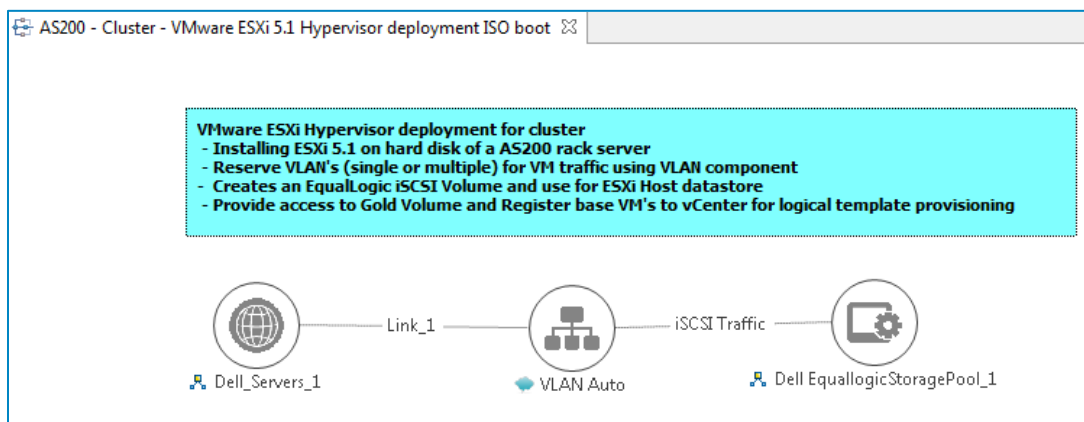
Active System Manager is shipped with three AS 200 VMWare physical templates for provisioning the ESXi on rack servers.

1. “AS200 Cluster - VMware ESXi 5.1 Hypervisor deployment ISO boot” template can be used for installing ESXi 5.1 on an SD card, configuring it to a VCenter Cluster, using ISO Boot.
2. “AS200 Standalone - VMware ESXi 5.1 Hypervisor deployment ISO boot” template can be used for installing ESXi 5.1 on an SD card, configuring it as a standalone server to the VCenter, using ISO Boot”.
3. “AS200 Standalone - VMware ESXi 5.1 Hypervisor deployment PXE boot” template can be used for installing ESXi 5.1 on an SD card, configuring it as a standalone server to the VCenter, using ISO Boot”.

### Multiple Rack Server for Cluster Provisioning

The *Cluster - VMware ESXi 5.1 Hypervisor deployment ISO boot and Cluster boot* template can be used for installing ESXi 5.1 on an SD card or hard disk, using either ISO Boot. You can specify one or more rack server s using this template for creating a cluster.

Figure 3. Multiple Rack Server for Cluster Provisioning



### Working with Clusters

Removing power from an ESXi cluster node deployed by Active System Manager (either by removing a server for service or from a power outage) causes storage connectivity to be lost upon reboot.

Active System Manager uses virtual MAC addresses as part of its ESXi provisioning strategy. When a server loses power these virtual mac addresses are not retained. Upon reboot the Broadcom iSCSI Adapters lose their configuration and subsequently lose their connectivity to the iSCSI storage volumes. The ability to retain the virtual MAC addresses after power is lost is a limitation of Dell server technology.

**NOTE:** There is no data loss in this situation.

The virtual MAC addresses are assigned to the server during the **Attach Server Profile** step during physical orchestration. In order to resolve the storage connectivity issue, run the **Attach Server Profile** step as a custom operation.

To reassign the virtual MAC addresses to the each node in the cluster:

1. In Active System Manager, click **Sessions**.
2. Double-click the Session associated with the ESXi Cluster.
3. Right-click in the open area of existing Permanent Session and select **Execute Orchestration**.
4. Select **Configure ESXi Server using ISO Boot**.
5. Deselect all the check boxes from all the steps in the **Execute** column with the exception of **Attach Server Profile**.
6. Click **OK**.

During the Attach Server Profile operation **ALL** ESXi node(s) that are associated with the session are rebooted. Down time will need to be scheduled in the scenario where a single node was serviced and the remaining cluster nodes are fine.

## Scheduling Physical Templates

**NOTE:** Traffic shaping can limit the bandwidth usage of your VMs. To make sure that VMware Traffic Shaping is disabled for Workload before scheduling the Physical Orchestration for ESXi provisioning, complete the following procedure:

1. From vCenter, click on the ESXi host.
2. Click the **Configuration** tab.
3. Click on the **Networking** link.
4. Click on **Properties of the vSwitch** which contains the VM-Workgroup port group.
5. Click on the **VM-Workgroup port group** and click **Edit**.
6. Click the **Traffic Shaping** tab.
7. Select **Disable** in the drop-down menu.
8. Deselect **Status**.
9. Click **OK**.
10. Click **Close**

When this template is scheduled, it performs the following sequence of operations:

1. Reserves single or multiple VLANs for VM traffic using a VLAN component. If the VLAN reserved in the session is not already configured on the ToR switches, then the VLANs are created and tagged to appropriate port-channels.
2. Creates the server profile and attaches it to the server, the attach server profile does the following
  - a. Configure the minimum and maximum bandwidth

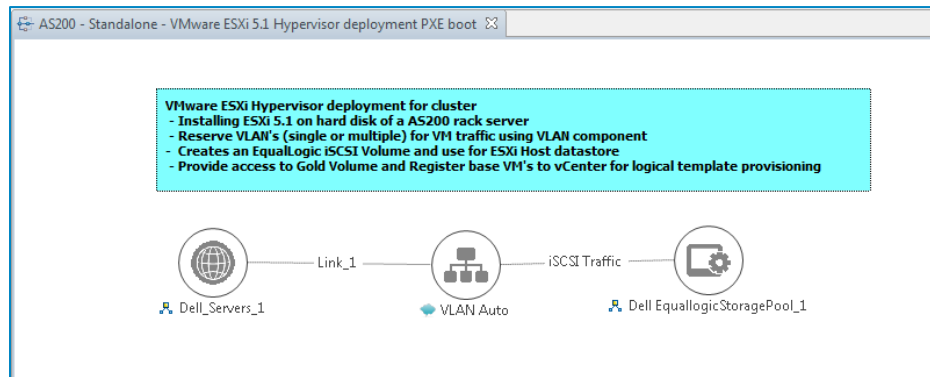
- b. Sets SD card as the first boot device
  - c. Disables iSCSI Offload on the NIC ports and enable iSCSI on 4<sup>th</sup> partition.
  - d. NIC Partitioning
    - i. NIC Partitioning is enabled on the CNA.
    - ii. NIC Partitioning is only supported Broadcom CNA.
  - e. Assigns vmac addresses for the partitions.
3. Creates the ISO files for each server dynamically based on the Server IP Address, Hostname, Name server values provided in the database.
  4. Mounts the ISO using iDRAC Virtual Media on all the servers and initiates the installation process.
  5. Configures the vSwitch configuration
    - a. Creates the vSwitch and port-groups based on Active System 200 deployment specification
    - b. Tags the port-groups with appropriate VLANs as specified in the template
    - c. Creates iSCSI Port-groups and installs and or configures the MEM VIBs
  6. Creates a volume of the EqualLogic Storage Array
    - a. The new volume is created per physical session based on the size specified in the orchestration input.
    - b. The authentication of the new volume is configured based on the Chap username and secret key specified in the inventory database of the servers.
  7. Creates a vCenter Cluster/Datacenter (if not already existing) on the specified vCenter. The cluster is created with default settings (DRS - On, HA - On, EVC - Disabled).
  8. Adds hosts to the vCenter cluster.
  9. The datastore created in the orchestration is used for provisioning the VM in the logical workload templates. Provides access to Gold volume and using Gold volume, creates base VMs.
  10. Installs EqualLogic MEM modules. The MEM package is transferred to the volume created in the above step to enable the installation.
  11. Registers base VMs to the vCenter for logical template provisioning.

**NOTE:** You should update the template for necessary inputs before scheduling this template for cluster provisioning. For more information, see [Updating Physical Templates](#).

## Single Rack Server for Standalone ESX Host PXE Boot Provisioning

The *Standalone—VMware ESXi 5.1 Hypervisor deployment with SD Card with vSwitch* can be used for installing ESXi 5.1 on an SD card, using either PXE Boot. User could specify one or more rack server s for standalone ESXi host provisioning.

Figure 4. Single Rack Server for Standalone ESX Host PXE boot Provisioning



Specify the AS200 VMWare PXE template that was created as part of the Template Global Parameters.

Template	Name	Value	Description
<b>Global Parameters</b>	<b>Compute</b>		
	ESXServerLicenseKey		License key for ESX host
<b>Provisioning</b>	ASMServerIPAddress	192.168.113.101	ASM Appliance IP address
<b>Attachments</b>	ImageName	san://PXE Bootable Images/esxi5.1_dell	ISO image path in repository
<b>History</b>	ServerProfileTemplate	AS200_PXE_VMware_template	Server Profile Template name
	WorkloadBurstSize	1024	Burst Size for Workload Network
	WorkloadAverageBandwidth	1024	Average Bandwidth for Workload ...
	WorkloadPeakBandwidth	1024	Peak Bandwidth for Workload Net...
	BootType	PXE	Boot Media , ISO or PXE
	<b>Storage</b>		
	StoragePoolName	default	Storage Pool name in EqualLogic S...
	GoldDatastoreVolumeName	gold-pxeimages	Gold Volume name where baseline...
	DatastoreVolumeSize	10g	Datastore size in EqualLogic Stroag...
	<b>vCenter</b>		
	vCenterIPAddress	192.168.113.63	vCenter IP address
	vCenterDatacenter	datacenterPXE	Datacenter name where ESX host t...
	vCenterFolderName	folderPXE	Folder name where ESX host to be ...

When this template is scheduled, this template performs the following sequence of operations:

1. Reserves single or multiple VLANs for VM traffic using a VLAN component. If the VLAN reserved in the session is not already configured on the ToR switches then the VLAN is created and tagged to appropriate port-channels.
2. TOR Configuration
  - a. The Native VLAN ID provided for Network1 is added as un-tagged VLAN on the server facing interface on S4810 switches.
  - b. The Native VLAN ID is mandatory for PXE boot scenario.
3. Creates the server profile and attaches it to the server, the attach server profile does the following
  - a. Configure the minimum and maximum bandwidth

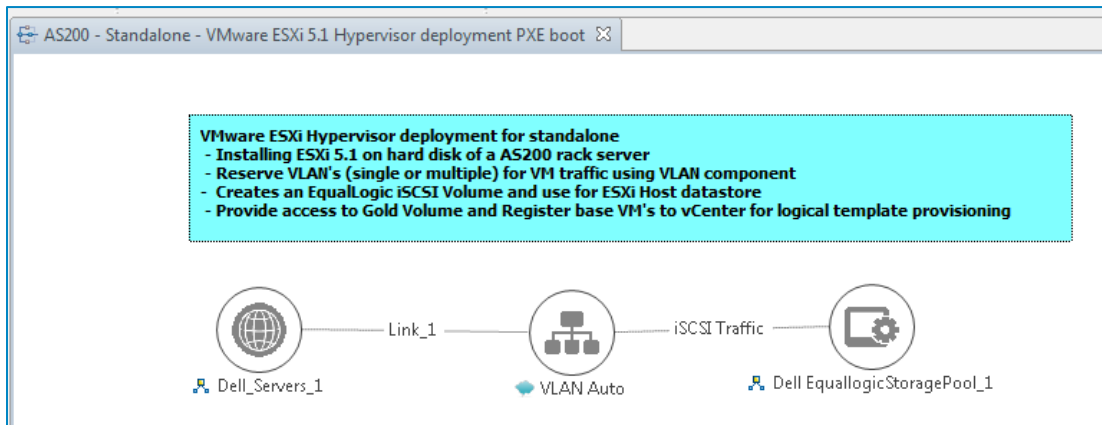
- b. Sets SD card as the first boot device
  - c. Disables iSCSI Offload on the NIC ports and enable iSCSI on 4<sup>th</sup> partition.
  - d. NIC Partitioning
    - i. NIC Partitioning is enabled on the CNA.
    - ii. NIC Partitioning is only supported Broadcom CNA.
  - e. Assigns vmac addresses for the partitions.
4. Create PXE boot configurations.
  5. Enable One-Time PXE boot for the server and Initiate PXE boot and once the PXE installation is done restore TOR configurations.
  6. Configures the vSwitch configuration
    - a. Creates the vSwitch and port-groups based on Active System 200 deployment specification
    - b. Tags the port-groups with appropriate VLANs as specified in the template
    - c. Creates iSCSI Port-groups and install and or configures the MEM VIBs
  7. Creates a volume of the EqualLogic Storage Array
    - a. The new volume is created per physical session based on the size specified in the Orchestration input.
    - b. The authentication of the new volume is configured based on the Chap username and secret key specified in the inventory database of the servers.
  8. Adds hosts to the vCenter at datacenter level.
  9. The datastore created in the orchestration is used for provisioning the VM in the logical workload templates. Provides access to Gold volume and using Gold volume, creates base VMs.
  10. Installs EqualLogic MEM modules. The MEM package is transferred to the volume created in the above step to enable the installation.
  11. Registers base VMs to the vCenter for logical template provisioning.

## Single Rack Server for Standalone ESX Host Provisioning

The *Standalone—VMware ESXi 5.1 Hypervisor deployment with SD Card with vSwitch and Standalone - VMware ESXi 5.1 Hypervisor deployment with HDD with vSwitch* templates can be used for installing ESXi 5.1 on an SD card or hard disk, using either PXE or ISO Boot. User could specify one or more rack server s for standalone ESXi host provisioning.



Figure 5. Single Rack Server for Standalone ESX Host Provisioning



When this template is scheduled, this template performs the following sequence of operations:

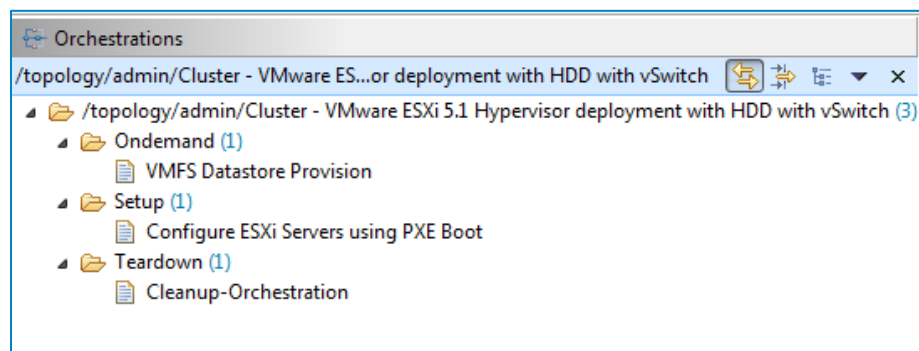
1. Reserves single or multiple VLANs for VM traffic using a VLAN component. If the VLAN reserved in the session is not already configured on the ToR switches then the VLAN is created and tagged to appropriate port-channels.
2. Creates the server profile and attaches it to the server, the attach server profile does the following:
  - a. Configure the minimum and maximum bandwidth
  - b. Sets SD card as the first boot device
  - c. Disables iSCSI Offload on the NIC ports and enable iSCSI on 4<sup>th</sup> partition.
  - d. NIC Partitioning
    - i. NIC Partitioning is enabled on the CNA.
    - ii. NIC Partitioning is only supported Broadcom CNA.
  - e. Assigns vmac addresses for the partitions.
3. Creates the ISO files for each server dynamically based on the Server IP Address, Hostname, Name server values provided in the database.
4. Mounts the ISO using iDRAC Virtual Media on all the servers and initiates the installation process.
5. Configures the vSwitch configuration
  - a. Creates the vSwitch and port-groups based on Active System 200 deployment specification
  - b. Tags the port-groups with appropriate VLANs as specified in the template
  - c. Creates iSCSI Port-groups and install and or configures the MEM VIBs
6. Creates a volume of the EqualLogic Storage Array
  - a. The new volume is created per physical session based on the size specified in the Orchestration input.

- b. The authentication of the new volume is configured based on the Chap username and secret key specified in the inventory database of the servers.
7. Adds hosts to the vCenter at datacenter level.
8. The datastore created in the orchestration is used for provisioning the VM in the logical workload templates. Provides access to Gold volume and using Gold volume, creates base VMs.
9. Installs EqualLogic MEM modules. The MEM package is transferred to the volume created in the above step to enable the installation.
10. Registers base VMs to the vCenter for logical template provisioning.

## Associated Orchestrations with Cluster and Standalone Host Templates

Each physical template has three orchestrations associated with it:

Figure 6. Orchestrations



- **On-demand**—*VMFS Datastore Provision* the new volume on the equallogic storage. This orchestration can be executed on-demand when the session is in a *Running* state.
- **Setup**—*Configures the ESXi Servers using PXE Boot*  
This orchestration executes when template provisioning starts and the session is in the *Setting Up* state.
- **Teardown**—*Cleanup-Orchestration*  
This orchestration executes when template provisioning start and session is in *Setting-Up* state.

## Additional Storage for Cluster or Host

For additional VMFS storage, or datastore needs on a cluster, or on a standalone ESXi host reserved through the Active System Manager, you can execute on-demand orchestration from a *Running* session. (I'm not sure what this sentence is trying to say)

For executing the on demand orchestration, open the session by double-clicking it. On the session, Right click on the session and select **Execute Orchestration** → **VMFS Datastore Provision**.

Orchestration performs the following sequence of operations:-

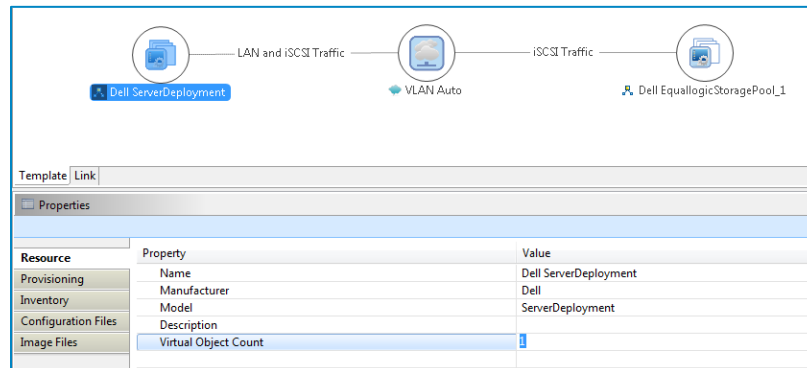
- Creates a new volume on EqualLogic storage.
- Allows access to specific cluster or standalone ESXi hosts, as applicable.
- Creates a VMFS datastore on a cluster or standalone ESXi hosts, as applicable.

## Updating Physical Templates

To update cluster and standalone templates that require specific data before scheduling a template for cluster provisioning, perform the following steps:

1. Update the rack server template. Increase the rack server count for cluster provisioning.

Figure 7. Updating Template for Rack server



2. Save the template.
3. Update the VLAN template.
4. Select the **VLAN Component**, click the **Inventory** tab, and update the **VLANCount** with the number of VLANs to be provisioned.
5. Update the VLAN ID range, as applicable, and update the **VLANId** parameter.
6. Save the template.
7. Provide input to the orchestration using one of two methods.
  - a. Double-click the **Configure ESXi Server using PXE Boot** orchestration to open it.
  - b. Double-click the **Orchestration Input** method to provide additional inputs to orchestration.

**Table 6.** Orchestration Input Parameters

Properties			
Template	Name	Value	Description
<b>Global Parameters</b>	[-] Compute		
Provisioning	ServerProfileTemplate	AS200 VMware template	Server Profile Template name
Attachments	ASMServerIPAddress	192.168.113.101	ASM Appliance IP address
History	ImageName	san://ISO Bootable Images/esxi5.1...	ISO image path in repository
	ESXServerLicenseKey		License key for ESX host
	BootProtocol	static	Boot Protocol for IP address assign...
	WorkloadBurstSize	1024	Burst Size for Workload Network
	WorkloadAverageBandwidth	1024	Average Bandwidth for Workload ...
	WorkloadPeakBandwidth	1024	Peak Bandwidth for Workload Net...
	BootType	VirtualMedia	Boot Media , ISO or PXE
	[-] Storage		
	StoragePoolName	default	Storage Pool name in EqualLogic S...
	DatastoreVolumeSize	10g	Datastore size in EqualLogic Stroag...
	GoldDatastoreVolumeName	gold-images	Gold Volume name where baseline...
	[-] vCenter		
	vCenterIPAddress	192.168.113.63	vCenter IP address
	vCenterDatacenter	AS200ClusterD	Datacenter name where ESX host t...
	vCenterFolderName	AS200ClusterF	Folder name where ESX host to be ...
	vCenterClusterName	as200clusterx	Cluster name where ESX host to be...

Parameter	Description
ImageName	Selects the ESXi image from the repository. The orchestration is already mapped with an existing ESXi image available on the appliance.
ESXServerLicenseKey	License key for the VMware ESXi hosts that will be provisioned by the orchestration.
ASMServerIPAdress	Specify the IP Address of the Active System Manager appliance in case of BootProtocol is DHCP.
ServerProfileTemplate	The Server Profile Template that has to be applied to this server.
BootType	Boot media, ISO or PXE.
GoldDatastoreVolumeName	Volume name consisting of baseline VM images that will be used for cloning new VMs.
DatastoreVolumeSize	Size in GB of the datastore to be provisioned on servers or a cluster.
StoragePoolName	Name of the pool on which the volume should be created for provisioning the datastore. This input should be provided from the EqualLogic Resource Pool repository.

Parameter	Description
vCenterFolderName	(optional) The vCenter folder where the ESXi hosts needs to be provisioned during the orchestration
vCenterClusterName	vCenter cluster name that will be provisioned by the orchestration. <b>NOTE:</b> The cluster name passed as an argument must not be the Management cluster.
vCenterDatacenter	vCenter data center to be used for provisioning.
vCenterIPAddress	vCenter IP Address as provided in the Discovery Setup configuration.

## Workload Provisioning Using Logical Templates

The following sections describe running a logical template for provisioning VMs on the deployed ESXi. Refer to the **VMware RA readme.txt** file for customizing the Virtual Machines authored in the templates.

### Pre-requisite to Provision a Virtual Machine

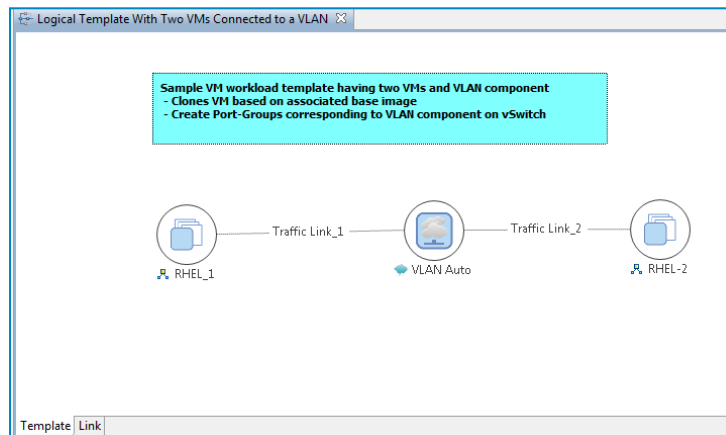
A Gold/Base VM must exist in the DataCenter, this Gold/Base VM will be used as gold image file to clone VMs.

The Gold VM and the template must contain one NIC with DHCP configuration accessible from the domain. This is required so that after the guest Customization, the VM receives a proper IP address which can be reached from the domain.

### Two VMs with a VLAN

The *Two virtual machine with a VLAN Logical* template can be used to create VM workloads by scheduling a logical template over existing physical resources sessions, to consume the compute and storage resources of specific physical components.

Figure 8. Two VMs Connected to a VLAN



When scheduled, this template performs the following sequence of operations:

- Clones and powers on two VMware VMs based on the Gold VM Image associated with the template.
- Creates port-groups corresponding to VLAN component on vSwitch.

After the VMs are provisioned, the user can also launch custom applications using custom methods.

**NOTE:** While scheduling a template with VM having multiple interfaces, even if VM is mapped to a Host having multiple interfaces, all the interfaces of VM are mapped to the same interface of the Host.

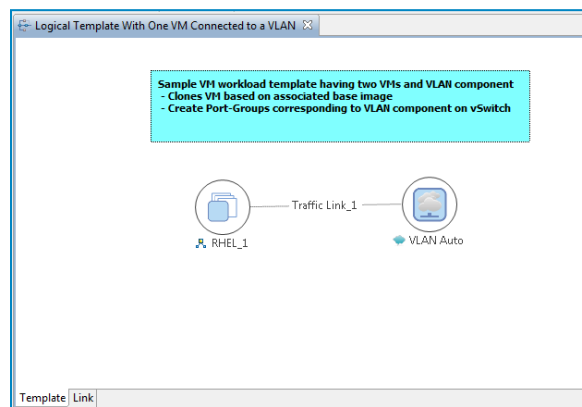
### To launch an application:

1. Right click a VM in a session.
2. Select **Applications**.
3. Select the application to be launched

## Single Virtual Machine with VLAN

The *Single virtual machine with a VLAN* Logical template can be used to create VM workloads by scheduling logical template over existing physical resources session, to consume the compute and storage resources of specific physical components.

Figure 9. Single VM Connected to a VLAN



When scheduled, this template performs the following sequence of operations:-

- Clones and powers on a single VMware VMs based on the Gold VM image associated with the template.
- Creates port-groups corresponding to a VLAN component on the vSwitch.
- Once the VMs are provisioned, you can also launch custom applications using custom methods from the Active System Manager Windows client.

**NOTE:** While scheduling a template with VM having multiple interfaces, even if VM is mapped to a Host having multiple interfaces, all the interfaces of VM are mapped to the same interface of the Host.

## Updating a Baseline VM Image on Logical Templates

To update the baseline VM image associated with the VM object in the template, perform the following steps:

1. Select the VM object in the template and click the **Image Files** tab.
2. Select the already associated image file and click **Remove** to remove the existing association.
3. Click **Add** and select the gold VM image to be associated with the VM object.

## Customizing the Guest OS (Optional)

Active System Manager supports Windows 2012 and Windows 2008 based Guest OS for VM creation. However, during Windows 2008 VM creation, Active System Manager is not able to retrieve the VM IP address. In this case, the Windows 2008 VM does have an IP address, but Active System Manage is not able to retrieve the IP address using the supported API set.

In order to customize the Operating System that will be on the VM, complete the following steps.

1. Open the logical template.
2. Select **Virtual Machine** object.
3. In the **Provisioning** tab, set **GuestCustomizationRequired** to true and update the following properties:
  - a. DomainName
  - b. TimeZone
  - c. AnswerFile
  - d. LocalUserName
  - e. LocalUserPassword
  - f. DomainUserName
  - g. DomainUserPassword
  - h. GuiRunOnceCommands
  - i. ProductKey

Figure 10. Customizing the Guest OS

The screenshot shows a logical template diagram with two objects: 'VirtualMachine\_1' (represented by a computer icon) and 'VLAN Auto' (represented by a network icon). They are connected by a dashed line labeled 'Link\_2'. Below the diagram is a 'Properties' window for the 'VirtualMachine\_1' object. The window has tabs for 'Template' and 'Link', and a 'Properties' section with a list of properties.

Resource	Name	Value	Scheduling Permission
<b>Provisioning</b>	AnswerFile		Hide
	Description		Hide
	DomainName		Hide
	DomainUserName		Hide
	DomainUserPassword		Hide
	GuestCustomizationRequired	false	Hide
	GuiRunOnceCommands		Hide
	HardwareProfileName	Gale_Profile	Hide
	Image Files		



## Operation Center View—Administrative Operations

The following sections describe Active System Manager administrative operations.

### Managing Servers

The following operations are provided on the Active System Manager Server Operation Center view to perform administrative tasks:

- Attach Server Profile—Used for attaching a server profile.
- Detach Server Profile—Used for detaching a server profile.
- Update firmware on server—to update the firmware on the server.

The screenshot displays the Active System Manager Operation Center interface. On the left, a tree view shows the hierarchy of resources under 'System [Domain]', including 'AS200\_1 [AS200]' and various server asset tags. The right pane is titled 'Resource Information' and shows 'Resource Details' for a selected server. Below this, there is a table of properties and a section for supported operations.

Name	Value
AssetTag	Server21AssetTag
AttachedProfile	NONE
BIOSVersion	1.6.1
Broadcom NetXtreme II 1 Gb Ethernet BCM57800 - ...	7.6.13
Broadcom NetXtreme II 1 Gb Ethernet BCM57800 - ...	7.6.13
Broadcom NetXtreme II 10 Gb Ethernet BCM57800 ...	7.6.13
Broadcom NetXtreme II 10 Gb Ethernet BCM57800 ...	7.6.13
Broadcom NetXtreme II 10 Gb Ethernet BCM57810 ...	7.2.0
Broadcom NetXtreme II 10 Gb Ethernet BCM57810 ...	7.2.0
CPU	2
domainId	1
DRACIPAddress	192.168.76.21
Enterprise UEFI Diagnostics	4225A2
Health	GREEN
HostName	
Integrated Dell Remote Access Controller.Firmware	1.40.40

**Supported Operations**

<a href="#">Attach Server Profile</a>	Attach Server Profile
<a href="#">Detach Server Profile</a>	Detach Server Profile
<a href="#">Update firmware on server</a>	Change firmware version on server

### Managing vCenter Objects

This section describes how the following managed objects can be directed through the **Operation Center** view. The vCenter discovery can be initiated using the Active System Manager Discovery facility, which populates the **Operation Center** view.

To initiate the discovery of a VMware vCenter, various discovery elements and their corresponding attributes can be provided in the Discovery Configuration Setup wizard; steps for configuring the discovery setup for a vCenter are detailed in *Discovering Active System 200 Components*.

- **Clusters and hosts**  
Clusters and hosts, along with their attributes, are discovered and populated in the **Operation Center** view. This view enables methods to be executed on clusters and hosts for on demand provisioning, as required.
- **VMware vSwitches**  
Hosts vSwitches are also discovered and populated in the Operation Center view as part of the vCenter Discovery process.
- **VMware datastores**  
Datastores are one of the most important components of the VMware-based virtualized infrastructure. Active System Manager supports the discovery of datastores managed by the vCenter. The various attributes of a datastores are also discovered and populated in the **Operation Center** view.

## Managing EqualLogic Storage

Table 7 lists and defines the group members provided in the Active System Manager EqualLogic Storage Operation Center view.

**Table 7.** EqualLogic Group Members

Operation	Description
<b>PoolCreate</b>	Creates a new storage pool on an EqualLogic storage array.
<b>PoolAddMember</b>	Adds a storage array to a given storage pool on an EqualLogic storage array.
<b>PoolDelete</b>	Deletes a storage pool present on an EqualLogic storage array.
<b>PoolRename</b>	Renames an existing storage pool present on an EqualLogic storage array.

## Managing Volume

Table 8 lists and defines the operations provided in the Active System Manager EqualLogic Storage Operation Center view.

**Table 8.** EqualLogic Group Members

Operation	Description
<b>VolumeOffline</b>	Offlines a volume present on an EqualLogic Storage Array.
<b>VolumeOnline</b>	Onlines a volume present on an EqualLogic Storage Array.
<b>VolumeResize</b>	Resizes a volume present on an EqualLogic Storage Array.

## Managing Storage

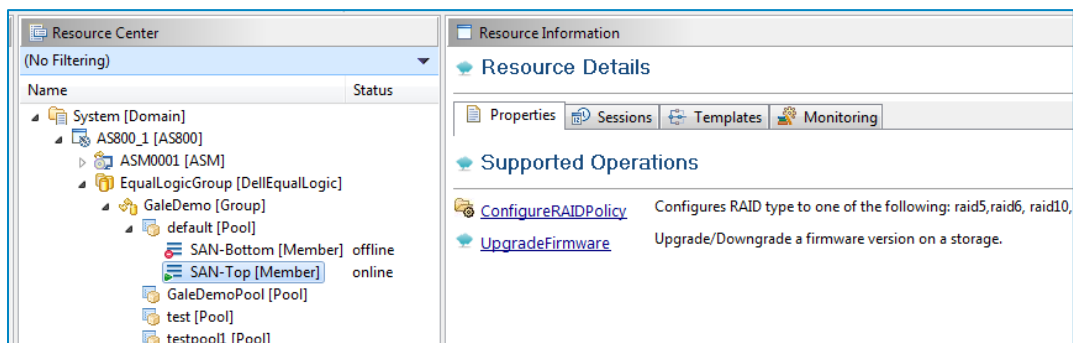
The following operations are provided on the Active System Manager EqualLogic Storage Operation Center view for performing administrative tasks:

- Storage group-level supported operations
- Storage member-level supported operations

**Table 9.** Storage Group-Level Supported Operations

Operation	Description	Input Parameter
DCBSetDefaultVlan	Sets a default VLAN ID for Data Center Bridging (DCB) on an EqualLogic storage array	<i>vLanId</i> —Default vLanId for dcb
DCBSetState	Enables or disables DCB on an EqualLogic storage array.	<i>dcbState</i> {enable   disable}
PoolCreate	Creates a new storage pool in the storage group.	<i>poolName</i> —Storage pool name

**Figure 11.** Storage Member-Level Supported Operations



**Table 10.** Storage Member-Level Supported Operations

Operation	Description	Input Parameter
ConfigureRAIDPolicy	Configures the required redundant array of independent disks (RAID) level on an EqualLogic Storage Array.	<i>raidType</i> {raid6   raid10   raid50}

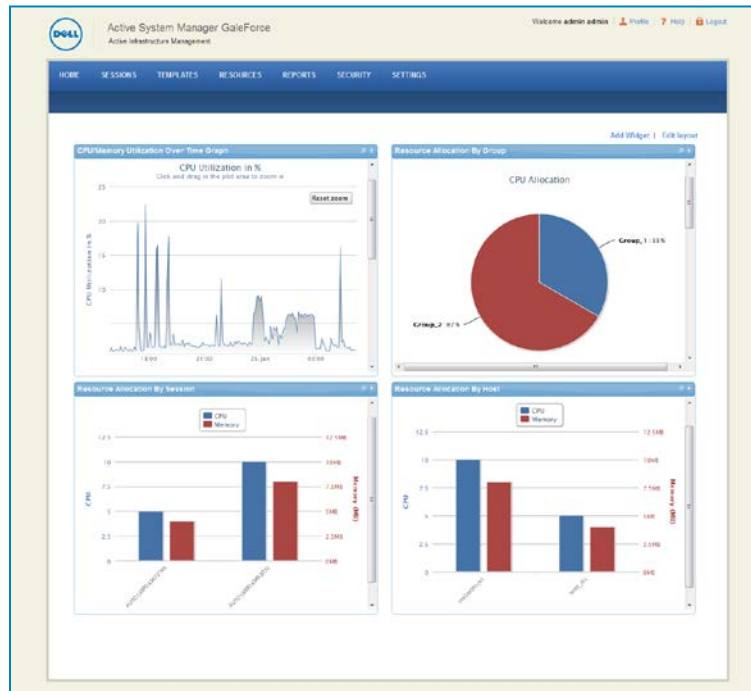
Operation	Description	Input Parameter
UpgradeFirmware	Upgrades the firmware image on an EqualLogic Storage Array.	<i>imageName</i> —Image from repository. <i>delayInMinutesAfterRestart</i> —Introduce wait once the firmware is installed and the member storage device is restarted, the RA connects the storage after this defined delay (in minutes) after the restart parameter.

## Dashboard Reports

### Resource Allocation by Sessions Report

This report provides resource allocation data for sessions which are in a *Running* state. This report displays CPU and memory allocations grouped by Active System Manager session, and can be used to view the CPU and memory allocation in a data center environment at that particular instant.

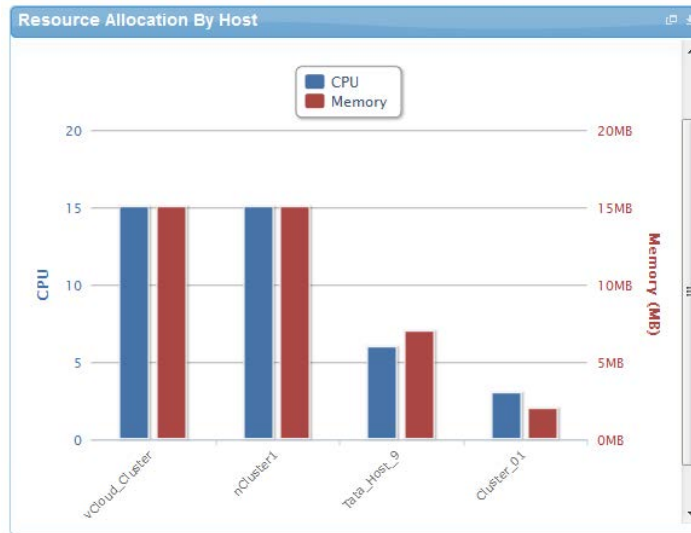
Figure 12. Resource Allocation by Sessions report



### Resource Allocation by Hosts Report

This report provides resource allocation data for hosts on which some virtual resources are provisioned in running sessions. This report displays CPU and memory allocations grouped by hosts, and can be used to view a current usage of the CPU and memory allocation per host for a data center.

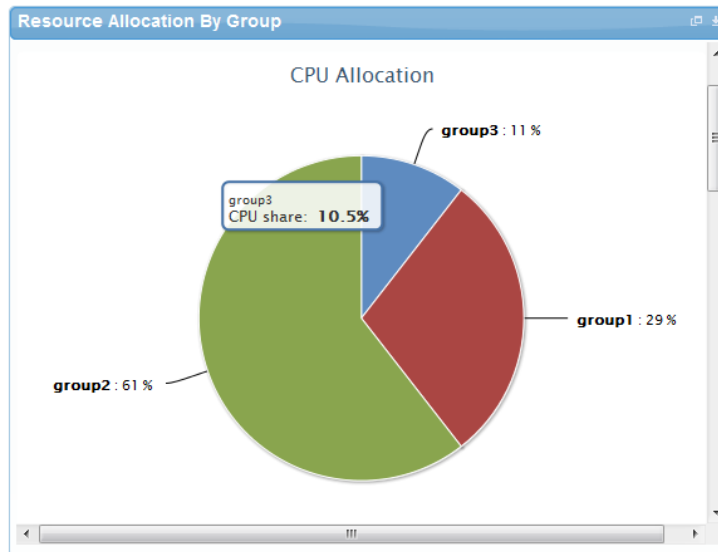
Figure 13. Resource Allocation by Hosts report



### Resource Allocation by Groups Report

This report provides resource allocation data for virtual resources that are utilized in sessions owned by members of a group (grouped by group name). This report also captures the current allocation by groups and works for CPU and memory allocation.

Figure 14. Resource Allocation by Groups report

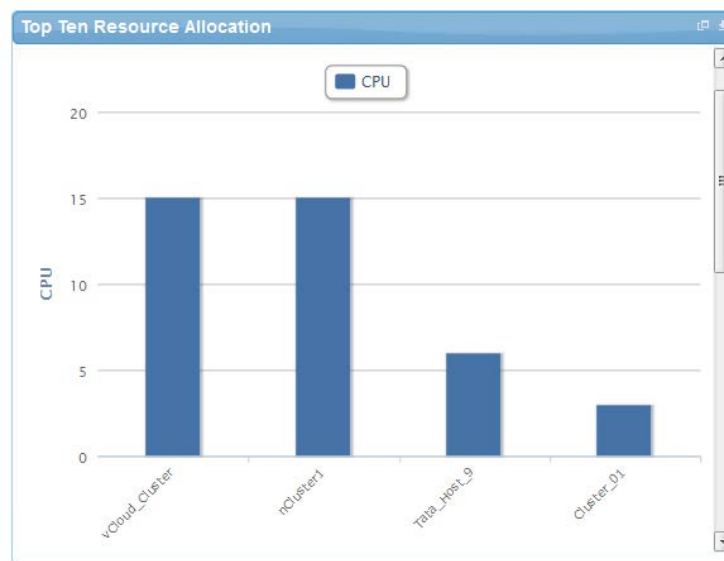


## Top Ten Resource Allocation Report

This report includes three sub-options for different groupings:

- **By Host**—Lists top ten hosts which are currently in use and have allocated maximum CPU and memory attributes.
- **By User**—Displays the list of top 10 users who are currently consuming the maximum number of CPUs and memory.
- **By Group**—Similar to By User, but consolidated at the group level.

Figure 15. Top Ten Resource Allocation report



## Top Ten Resource Utilization Report

This report is similar to the Top Ten Resource Allocation report; however, this report provides utilization data as opposed to allocation. The required data is made available using a monitoring method that continuously keeps polling the device, VM, or cluster for current utilization data. The data is persisted in the database and the last polled data is provided to the user. This report can be grouped by the following:

- VMs
- Hosts
- Clusters
- Storage

Figure 16. Top Ten Resource Utilization report by cluster

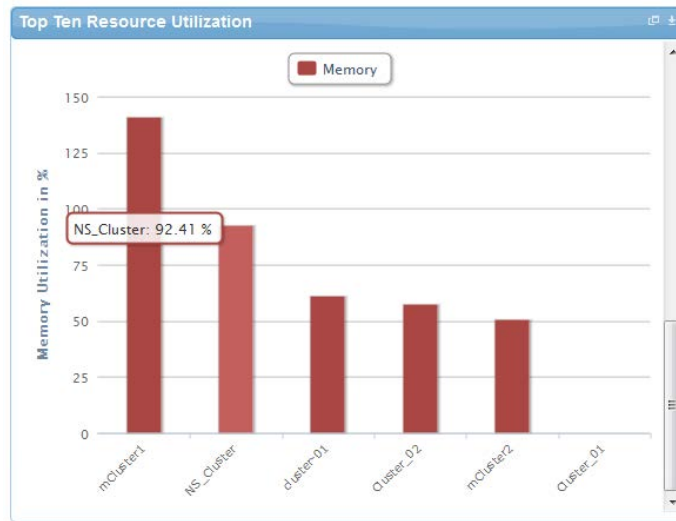
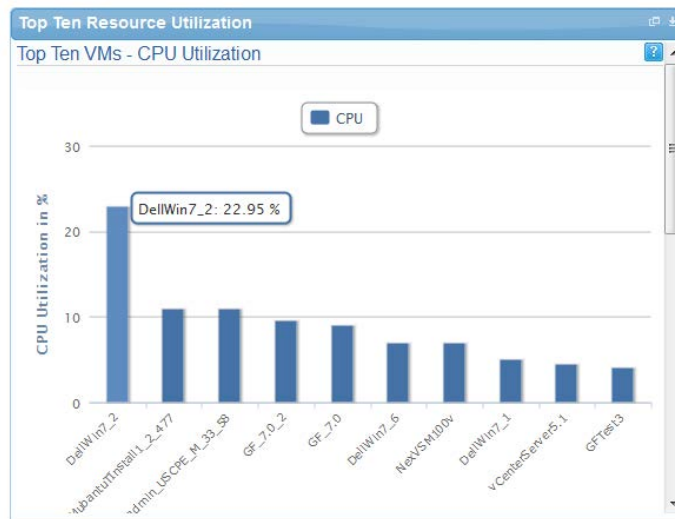


Figure 17. Top Ten Resource Utilization report by host





## VM Utilization by Session Report

This report provides the most recent data for CPU and memory utilized on any VM, grouped by sessions. This data is available in terms of percentage with respect to the allocated limits.

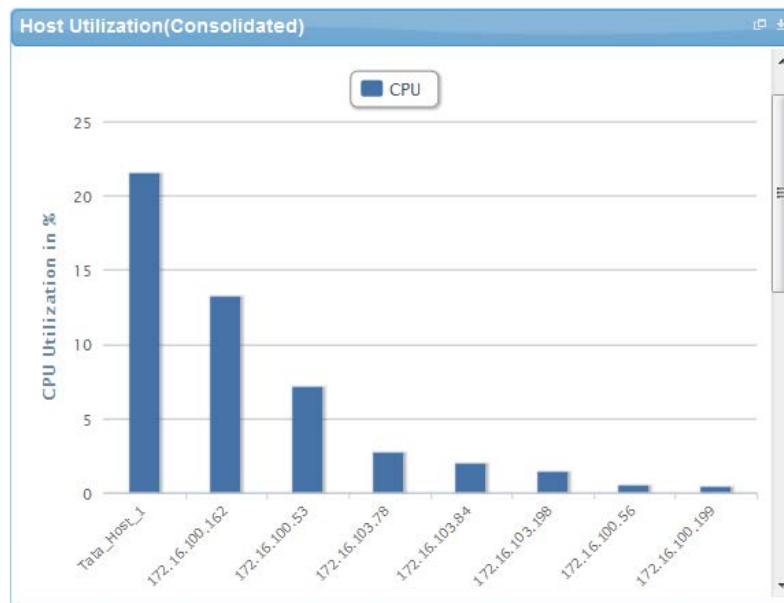
Figure 18. VM Utilization by Session report



## Host Utilization (Consolidated) Report

This report displays information about how much capacity is being utilized on a host by all running VMs, with respect to the allocated capacity. This report is available for CPU and memory attributes.

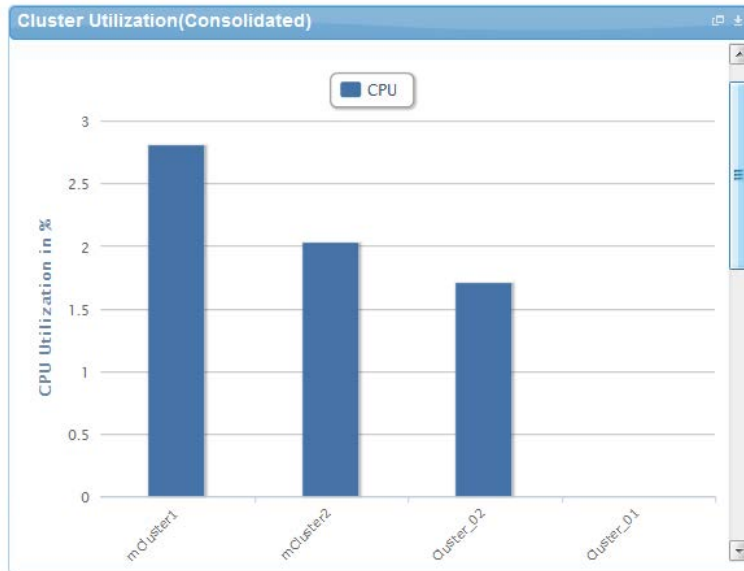
Figure 19. Host Utilization (Consolidated) report



## Cluster Utilization (Consolidated) Report

This report is similar to the Host Utilization (Consolidated) report, except that it uses clusters.

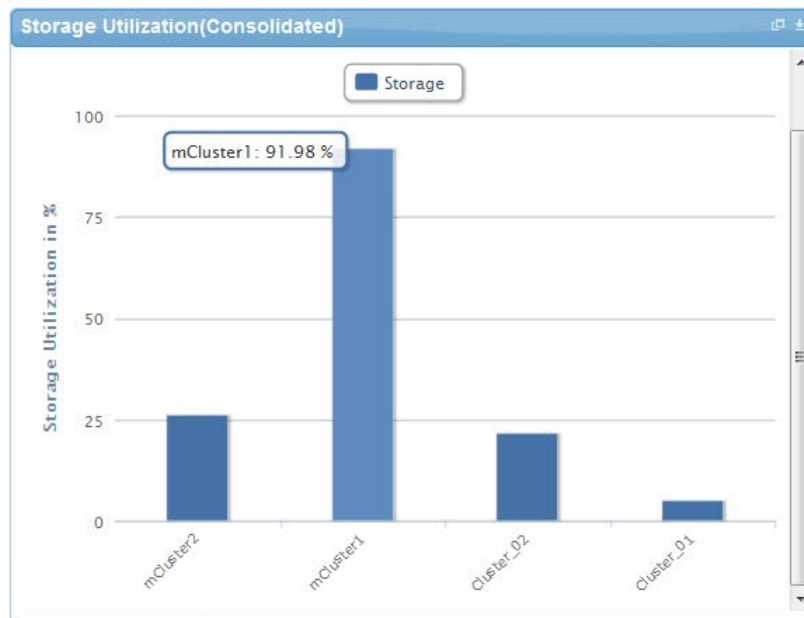
Figure 20. Cluster Utilization (Consolidated) report



## Storage Utilization (Consolidated) Report

This report provides storage utilization as a percentage of allocated storage for clusters.

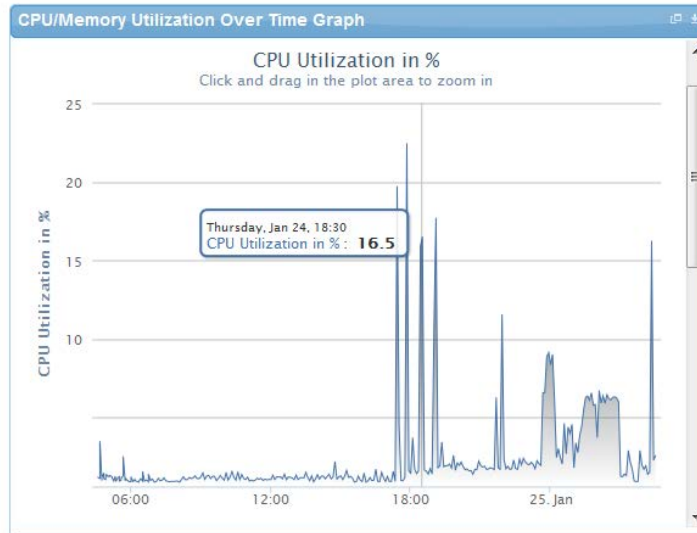
Figure 21. Storage Utilization (Consolidated) report



## CPU and Memory Utilization Showback Report

This report provides CPU and memory utilization of hosts in percentage over a period of given time (e.g. weekly, daily, and hourly).

Figure 22. CPU & Memory Utilization Showback Report



You can view the data for a specific time interval (with a minimum time interval limit of ten minutes between two data points). To view the specific time interval data, select a point and drag the mouse to a desired data point; this will show the data for the specific time interval. You can reset the time interval to default by clicking **Reset Zoom**.

## Appendix A—Bill of Materials

Table 11 displays the bill of materials, grouped by Resource Adapters.

**Table 11.** Build of Material—Resource Adapters

Vendor	Model	Description
Dell	Servers	Dell Servers resource adapter using WSMAN and RACADM CLI used for provisioning the servers
Dell	EqualLogicPS6110	Management of EqualLogic storage
Dell	EqualLogicStoragePool	Management of EqualLogic storage pool
Dell	Force10-S4810	Management of ToR switches
Template	VMwareLib	VMware Host Provisioning on Servers
VMware	Host	VMware vCenter Management
VMware	Virtual Machine	VMware Virtual Machine Instance Management
HyperV	TBD	TBD

Table 12 displays the list of bill of materials, grouped by templates.

**Table 12.** Bill of Material—Templates

ID	Description	Workflows
1—Physical	AS200 -Cluster - VMware ESXi 5.1 Hypervisor deployment ISO boot	Configure ESXi Servers using ISO Boot, Cleanup-Orchestration, and VMFS Datastore Provision.
	AS200 - Cluster HyperV 2012 Hypervisor Deployment	Configure HyperV hypervisor cluster
3-Physical	AS200 - Standalone - VMware ESXi 5.1 Hypervisor deployment PXE boot	Configure ESXi servers using PXE Boot, Cleanup-Orchestration, and VMFS Datastore Provision.
4-Physical	AS200 - Standalone - VMware ESXi 5.1 Hypervisor deployment ISO boot	Configure ESXi servers using ISO Boot, Cleanup-Orchestration, and VMFS Datastore Provision.
5—Logical	Logical template with one VM connected to a VLAN	Built-in orchestration.

<b>6—Logical</b>	Logical template with two VMs connected to a VLAN	Built-in orchestration.
<b>7-Logical</b>	HyperV - Logical template with one VM connected to a VLAN	Built-in orchestration
<b>8-Logical</b>	HyperV - Logical template with two VMs connected to a VLAN	Built-in orchestration
<b>9-Logical</b>	HyperV Microsoft SQL workload	Built-in orchestration

## Appendix B—Firmware and Software Base Lineup

The following table lists the minimum recommended firmware/software versions.

**Table 13. Firmware and Software versions**

Device	Revision
<b>Compute and Management Server - R720 &amp; R620</b>	
BIOS	1.6.0
iDRAC7 Enterprise	1.40.40
LCC (Life Cycle Controller) 2	1.1.5.165
Network Controller Broadcom FW	7.6
EqualLogic MEM	1.1.2
VMware ESXi	5.1 U1 (Build 1065491 A01)
<b>Management VMs and Software</b>	
VMware vCenter Server	5.1 U1 (Build 1065491 A01)
Dell EqualLogic Virtual Storage Manager (VSM)	3.5.2
Dell OpenManage Plug-in for vCenter	1.6 (A00)
SAN HQ	2.6 EPA
VMware vCloud Connector	1.5
Dell OpenManage Essentials	1.2
Dell OpenManage Repository Manager	1.4.113
Cell Multi-UPS Management Console (MUMC)	1.6.0001
<b>Storage, Switches, UPS</b>	
Force 10 S4810 (LAN)	9.1.0.0
Force 10 S55 (OOB)	8.3.5.3
EqualLogic PS Array(s)	6.0.5

Device	Revision
<b>Compute and Management Server - R720 &amp; R620</b>	
Dell 2700W UPS FW	1.14.0003 A07
Dell UPS NMC FW	1.16.0001 A08

## Appendix C—Adding New ESXi PXE Images

This appendix describes the following topics related to adding new ESXi images:

- Preparing the VMware ESXi 5.x Installation Media
- Modifying the ESXi boot.cfg Configuration File
- Configuring the HTTP Server  
Creating a Kickstart Configuration File

### Preparing the VMware ESXi 5.x Installation Media

To prepare the VMware ESXi 5.x installation media, perform the following steps:

1. Log in to [www.dell.com](http://www.dell.com).
2. Open the support and driver page:  
([http://www.dell.com/support/drivers/us/en/04/ProductSelector/Select?rquery=fkey-e-Drivers\\_PS](http://www.dell.com/support/drivers/us/en/04/ProductSelector/Select?rquery=fkey-e-Drivers_PS))
3. Select **Server** → **Storage & Networking**.
4. Select **PowerEdge**.
5. Select **PowerEdge R720**.
6. Select **VMware ESXi 5.1**.
7. On your Trivial File Transfer Protocol (TFTP) server, extract the contents of the installation ISO into a new directory using the following commands (login as the **root** user):

```
# mkdir /tmp/dellISO
# mkdir /tftpboot/esxi5.1_dell

# mount -o loop VMware-VMvisor-Installer-5.1.0-799733.x86_64-
Dell_Customized_RecoveryCD_A00.iso tmp/dellISO

# cp -fr /tmp/dellISO/* /var/lib/tftpboot/esxi5.1_dell/
# chmod +w /tftpboot/esxi5.1_dell/*
```

### Modifying the ESXi boot.cfg Configuration File

To confirm that the installation source is not in the root of the TFTP server, perform the following steps:

1. Remove all slashes (/) from the **boot.cfg** file so that relative paths are used.
2. Add a prefix directive to the **boot.cfg** file to specify the proper subdirectory, from the perspective of the TFTP root:

```
# cat boot.cfg

bootstate=0
```



```

title>Loading ESXi installer

kernel=tboot.b00

kernelopt=ks=http://xx.xx.xx.xx/esxi5.1_dell/ks.cfg

modules=b.b00 --- useropts.gz --- k.b00 --- chardevs.b00 --- a.b00 ---
user.b00 --- s.v00 --- misc_cni.v00 --- net_bnx2.v00 --- net_bnx2.v01 ---
net_cnic.v00 --- net_tg3.v00 --- scsi_bnx.v00 --- scsi_bnx.v01 ---
net_bna.v00 --- scsi_bfa.v00 --- ima_be2i.v00 --- scsi_be2.v00 ---
net_igb.v00 --- scsi_mpt.v00 --- ima_qla4.v00 --- net_qlcn.v00 ---
scsi_qla.v00 --- ata_pata.v00 --- ata_pata.v01 --- ata_pata.v02 ---
ata_pata.v03 --- ata_pata.v04 --- ata_pata.v05 --- ata_pata.v06 ---
ata_pata.v07 --- block_cc.v00 --- ehci_ehc.v00 --- weaselin.t00 ---
esx_dvfi.v00 --- xlibs.v00 --- ipmi_ipm.v00 --- ipmi_ipm.v01 --- ipmi_ipm.v02
--- misc_dri.v00 --- net_be2n.v00 --- net_e100.v00 --- net_e100.v01 ---
net_enic.v00 --- net_forc.v00 --- net_ixgb.v00 --- net_nx_n.v00 ---
net_qlge.v00 --- net_r816.v00 --- net_r816.v01 --- net_s2io.v00 ---
net_sky2.v00 --- net_vmxn.v00 --- ohci_usb.v00 --- sata_ahc.v00 ---
sata_ata.v00 --- sata_sat.v00 --- sata_sat.v01 --- sata_sat.v02 ---
sata_sat.v03 --- sata_sat.v04 --- scsi_aac.v00 --- scsi_adp.v00 ---
scsi_aic.v00 --- scsi_fni.v00 --- scsi_hps.v00 --- scsi_ips.v00 ---
scsi_lpf.v00 --- scsi_meg.v00 --- scsi_meg.v01 --- scsi_meg.v02 ---
scsi_mpt.v01 --- scsi_mpt.v02 --- scsi_rst.v00 --- uhci_usb.v00 --- tools.t00
--- scsi_qla.v01 --- dell_con.v00 --- xorg.v00 --- imgdb.tgz --- imgpayld.tgz

build=

updated=0

# chmod +w /var/lib/tftpboot/esxi5.1_dell/*

```

## Adding a PXE Menu Entry

Create a file named `pxe.cfg` containing the following code. Place this file inside the image directory on the TFTP server.

```

DEFAULT menu.c32

MENU TITLE ESXi-5.1 Boot Menu

NOHALT 1

PROMPT 0

TIMEOUT 80

LABEL install

    KERNEL esxi5.1_dell/mboot.c32

```

```
APPEND -c /esxi5.1_dell/boot.cfg ks=http://KSFILEPATH +++  
  
MENU LABEL ESXi-5.1 ^Installer  
  
LABEL hddboot  
  
LOCALBOOT 0x80  
  
MENU LABEL ^Boot from local disk
```

**NOTE:** The value of `KSFILEPATH` will be replaced dynamically by the Resource Adapter with the TFTP IP address value defined for the PXE Repo repository (assuming the TFTP server and the web server are running on the same machine). If dynamic replacement is not required, place the of the IP address (or hostname) value of the web server where the `ks.cfg` file is located.

## Configuring the HTTP Server

HTTP services are enabled, by default, on the appliance.

## Creating a Kickstart Configuration File

To create a kickstart configuration file, perform the following steps:

1. Create the image directory on the HTTP server base location.

```
# cd /var/www/html  
  
# mkdir esxi5.1_dell
```

**NOTE:** The name of the directory needs to be same as the image directory created on the TFTP server.

2. Create a file named `ks_template.cfg` containing the following code. Place this file inside the image directory on the HTTP server.

```
# Sample scripted installation file  
  
# Accept the VMware End User License Agreement  
  
vmaccepteula  
  
# Set the root password for the DCUI and ESXi Shell  
  
rootpw <PASSWORD>  
  
  
  
clearpart --firstdisk=<FIRSTDISK> --overwritevmfs  
  
  
  
# Install on the first local disk available on machine  
  
install --firstdisk=<FIRSTDISK> --overwritevmfs
```

```
# Set the network to DHCP on the first network adapter, use the specified  
hostname and do not create a portgroup for the VMs
```

```
<NETWORKCONTENT>
```

```
# reboots the host after the scripted installation is completed
```

```
reboot
```

```
%firstboot --interpreter=busybox
```

```
<FIRSTBOOTDATA>
```

**NOTE:**

- The value of <PASSWORD> will be replaced with the password string defined in the Resource Adapter configuration file. The default value is **iforgot**.
- The value of <FIRSTDISK> will be replaced by `local/usb`, depending on the boot sequence defined in the deployment template.
- The value of <NETWORKCONTENT> will be replaced for the DHCP or static IP address configuration. The default configuration is **dhcp**. If the value of the IP address, subnet mask, and name-server is provided in the inventory, then the static IP address configuration will be applied on the server.
- The value of <FIRSTBOOT> will be replaced by the network configuration template file, available inside the Resource Adapter package. The configuration is based on the specifications for the Active System 200VMware Deployment document.
- The <FIRSTBOOT> configuration also includes:
  - iSCSI initiator configuration
  - ESXi license Key. The value is added if the license key information is available in the resource adapter configuration file.
  - Name of the Local datastore

## Adding the New Image to the Software Repositories

If the new image is added by replacing the earlier image directory, then no change is required.

If the new image is added with a new name/directory then the PXE Bootable Image repository must be updated, as described in the Updating Repository Elements for PXE Bootable Images section.

## Appendix D—Adding New ESXi ISO Images

This appendix describes the following topics related to adding new ESXi images:

- Preparing the VMware ESXi 5.x Installation Media
- Modifying the ESXi boot.cfg Configuration File
- Configuring the HTTP Server  
Creating a Kickstart Configuration File

## Preparing the VMware ESXi 5.x Installation Media

To prepare the VMware ESXi 5.x installation media, perform the following steps:

3. Log in to [www.dell.com](http://www.dell.com).
4. Open the support and driver page:  
([http://www.dell.com/support/drivers/us/en/04/ProductSelector/Select?rquery=fkey-e-Drivers\\_PS](http://www.dell.com/support/drivers/us/en/04/ProductSelector/Select?rquery=fkey-e-Drivers_PS))
5. Select **Server** → **Storage & Networking**.
6. Select **PowerEdge**.
7. Select **PowerEdge R720**.
8. Select **VMware ESXi 5.1**.

The image is listed in the **Drivers for OS Deployment** section.

9. On your Active System Manager appliance server, extract the contents of the installation ISO into a new directory using the following commands (login as the **root** user) :

```
# mkdir /tmp/dellISO

# mkdir /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New

# mount -o loop VMware-VMvisor-Installer-5.1.0-799733.x86_64-
Dell_Customized_RecoveryCD_A00.iso /tmp/dellISO

# cp -fr /tmp/dellISO /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New

# chmod +w /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New/*
```

**NOTE:** If the newly added image needs to replace the existing image, then execute following commands:

```
mv /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New
/home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot
```

## Modifying the ESXi boot.cfg Configuration File

To confirm that the installation source is not in the root of the TFTP server, perform the following steps:

1. Update the **kernelopt** parameter to point the kickstart file to the CD-ROM:

```
# cat boot.cfg

bootstate=0

title>Loading ESXi installer

kernel=/tboot.b00
```

```
kernelopt=ks=cdrom:/KS.CFG
```

```
modules=/b.b00 --- /useropts.gz --- /k.b00 --- /chardevs.b00 --- /a.b00 ---
/user.b00 --- /s.v00 --- /misc_cni.v00 --- /net_bnx2.v00 --- /net_bnx2.v01 --
- /net_cnic.v00 --- /net_tg3.v00 --- /scsi_bnx.v00 --- /scsi_bnx.v01 ---
/net_bna.v00 --- /scsi_bfa.v00 --- /ima_be2i.v00 --- /scsi_be2.v00 ---
/net_igb.v00 --- /scsi_mpt.v00 --- /ima_qla4.v00 --- /net_qlcn.v00 ---
/scsi_qla.v00 --- /ata_pata.v00 --- /ata_pata.v01 --- /ata_pata.v02 ---
/ata_pata.v03 --- /ata_pata.v04 --- /ata_pata.v05 --- /ata_pata.v06 ---
/ata_pata.v07 --- /block_cc.v00 --- /ehci_ehc.v00 --- /weaselin.t00 ---
/esx_dvfi.v00 --- /xlibs.v00 --- /ipmi_ipm.v00 --- /ipmi_ipm.v01 ---
/ipmi_ipm.v02 --- /misc_dri.v00 --- /net_be2n.v00 --- /net_e100.v00 ---
/net_e100.v01 --- /net_enic.v00 --- /net_forc.v00 --- /net_ixgb.v00 ---
/net_nx_n.v00 --- /net_qlge.v00 --- /net_r816.v00 --- /net_r816.v01 ---
/net_s2io.v00 --- /net_sky2.v00 --- /net_vmxn.v00 --- /ohci_usb.v00 ---
/sata_ahc.v00 --- /sata_ata.v00 --- /sata_sat.v00 --- /sata_sat.v01 ---
/sata_sat.v02 --- /sata_sat.v03 --- /sata_sat.v04 --- /scsi_aac.v00 ---
/scsi_adp.v00 --- /scsi_aic.v00 --- /scsi_fni.v00 --- /scsi_hps.v00 ---
/scsi_ips.v00 --- /scsi_lpf.v00 --- /scsi_meg.v00 --- /scsi_meg.v01 ---
/scsi_meg.v02 --- /scsi_mpt.v01 --- /scsi_mpt.v02 --- /scsi_rst.v00 ---
/uhci_usb.v00 --- /tools.t00 --- /scsi_qla.v01 --- /dell_con.v00 ---
/xorg.v00 --- /imgdb.tgz --- /imgpayld.tgz
```

```
build=
```

```
updated=0
```

```
# chmod +w /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New/*
```

## Creating a Kickstart Configuration File

1. Create the image directory on the HTTP server base location:

```
# cd /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New
```

**NOTE:** The name of the directory needs to be same as the image directory created on the TFTP server.

2. Create a file named `ks.cfg` containing the following code. Place the file in the image directory.

```
# Sample scripted installation file
```

```
# Accept the VMware End User License Agreement
```

```
vmaccepteula
```

```
# Set the root password for the DCUI and ESXi Shell
```

```
rootpw <PASSWORD>
```

```
clearpart --firstdisk=<FIRSTDISK> --overwritevmfs
```

```
# Install on the first local disk available on machine

install --firstdisk=<FIRSTDISK> --overwritevmfs

# Set the network to DHCP on the first network adapter, use the specified
hostname and do not create a portgroup for the VMs

<NETWORKCONTENT>

# reboots the host after the scripted installation is completed

reboot

%firstboot --interpreter=busybox

<FIRSTBOOTDATA>
```

**NOTE:**

- The value of <PASSWORD> will be replaced with the password string defined in the Resource Adapter configuration file. The default value is `iforgot`.
- The value of <FIRSTDISK> will be replaced by `local/usb`, depending on the boot sequence defined in the deployment template.
- The value of <NETWORKCONTENT> will be replaced for the DHCP or static IP address configuration. The default configuration is `dhcp`. If the value of the IP address, subnet mask, and name-server is provided in the inventory, then the static IP address configuration will be applied on the server.
- The value of <FIRSTBOOT> will be replaced by the network configuration template file, available inside the Resource Adapter package. The configuration is based on the specifications for the Active System 200VMware Deployment document.
- The <FIRSTBOOT> configuration also includes:
  - iSCSI initiator configuration
  - ESXi license Key. The value is added if the license key information is available in the resource adapter configuration file.

Name of the Local datastore

3. Copy the `ks.cfg` file to the HTTP Server base location.

```
mkdir -p /var/www/html/esxi5.1_dell_ISOBoot_New/
```

```
cp /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot_New/ks.cfg
/var/www/html/esxi5.1_dell_ISOBoot_New/ks.cfg
```

If the existing image directory is being replaced, skip the above commands and execute the following:

```
mkdir -p /var/www/html/esxi5.1_dell_ISOBoot
```

```
cp /home/delladmin/ISOBootImages/esxi5.1_dell_ISOBoot/ks.cfg  
/var/www/html/esxi5.1_dell_ISOBoot/ks.cfg
```

4. Update the file permission on the newly added image:

```
chown -R delladmin:delladmin /home/delladmin/ISOBootImages
```

```
chmod -R +w /home/delladmin/ISOBootImages/
```

## Adding the New Image to the Software Repositories

If the new image is added by replacing the earlier image directory, then no change is required.

If the new image is added with a new name/directory then the ISO Bootable Image repository must be updated, as described in the Updating Repository Elements for ISO Bootable Images section.



## Appendix E— Planning Worksheet

Table 14. Out of Band Management IP Address Configuration

Equipment	IP Address	Subnet Mask	Gateway	Username	Password
iDRAC for all R720					
Force10 S4810 Switch1					
Force10 S4810 Switch2					
EqualLogic Storage Array Group Management					
EqualLogic Storage Array Group on iSCSI Network					
Active System Manager Appliance					
vCenter					

### ESXI Server IP Configuration

The following parameters for each server are required:

- `iSCSIChapUsername` - iSCSI Chap username used to access volume of EqualLogic Storage Array
- `iSCSIChapSecret` - iSCSI Chap secret corresponding to iSCSI Chap username.
- `ServerHostname`—Hostname to be assigned to the ESXi server.
- `ServerPassword` - Server password to be assigned during unattended installation.

#### VMware Workloads:

- Administrator needs to create a volume on EqualLogic storage array manually
- This volume needs to contain the base line VMs that will be used for creating the VM workloads.

**NOTE:** The base line VMs needs to have VMware Tools installed.

## Appendix F—PXE Setup Requirements

Considerations before creating the DHCP Server:

- The PXE Network must be separate from the Management Network.
- Active System Manager must have a network interface with same subnet as the TFTP Server. Appliance uses ARP entries for identifying the IP Address assigned to the ESXi Servers by the DHCP Server.
- The Active System Manager VM appliance has pre-defined templates for installing ESXi 5.1 on the Dell rack servers using PXE boot. For enabling the Preboot Execution Environment (PXE) boot, the following additional services are configured on the appliance:

### TFTP Server

TFTP services are enabled and deployed at `/var/lib/tftpboot` on the appliance. The ESXi Dell customized image is embedded within the appliance.

### HTTP Server

HTTP services are enabled on the appliance.

### DHCP Server

DHCP services are disabled on the appliance to avoid any issue with an existing DHCP server that may already be running on the same customer network. For the PXE setup requirement, the DHCP services should be running on the same network as the PXE. The DHCP server is configured to use `Eth1` on the appliance

The VM appliance is created with one vNIC. The vNIC needs to be in the Hypervisor Management Network.

## Configuring PXE Setup with Embedded DHCP Server

The DHCP Services needs to be enabled on separate network interface on the appliance. Before configuring the DHCP Services, add a new Virtual NIC on the appliance using the VMware vSphere client and restart the appliance.

### Configuring the DHCP Server

1. Connect to the VM appliance console using the `root` user credentials through either the VMware vSphere Client VM console or the Hyper-V VM console.
2. Assign a static IP address on the `eth1` interface. This IP Address must belong to the hypervisor Management subnet.
3. Add the following content to the `/etc/sysconfig/dhcpd` file.

```
# Command line options here
```

```
DHCPDARGS="eth1"
```

4. Edit the `/etc/dhcp/dhcpd.conf` file.

5. Update the values of the IP address ranges and subnets per the customer environment.
6. Update the value of the next server with the VM appliance IP address on the same subnet as the DHCP server (`eth0` IP address). The next-server represents the TFTP server where the image is hosted.

---

```
# DHCP Server for Hypervisor management network

# Uncomment following lines with appropriate IP Address range
```

---

```
subnet 192.168.122.0 netmask 255.255.255.0 {
    range 192.168.122.102 192.168.122.230;
    allow booting;
    allow bootp;
    filename "pxelinux.0";
    next-server 192.168.122.101;

# --- default gateway

    option routers                192.168.122.1;
    option subnet-mask            255.255.255.0;
    option domain-name-servers    192.168.122.1;

    option netbios-node-type 2;

    default-lease-time 28200;
    max-lease-time 28200;
}
```

### Configuring the TFTP Server

The ESXi 5.1 customized image is embedded inside the appliance at `/var/lib/tftpboot/esxi51._dell`. The image is configured to create a kickstart file dynamically based on the IP address provided in the Active System Manager inventory.

If the ESXi host is configured to learn the IP address through DHCP (configured through orchestration), and then there is no need to update the Server IP Address information in the Active System Manager inventory. The IP Address configured on the hosts by the DHCP server will be updated automatically during the server installation.

If a new image is required to be added to the appliance, follow the steps available in

## Appendix B—Firmware and Software Base Lineup.

To start the DHCP services, execute the `/etc/init.d/dhcpd restart` command.

### Configuring the PXE Setup with the Existing DHCP Server

If the DHCP server already exists on the Hypervisor Management Network, perform the following steps:

1. Update the appliance's DHCP settings to support the Bootstrap Protocol (BOOTP).
2. Edit the `/etc/dhcpd/dhcpd.conf` file. Update the `next-server` to point to the Active System Manager appliance IP address; the images are hosted on the appliance.

```
allow booting;
```

```
allow bootp;
```

```
filename "pxelinux.0";
```

```
next-server 192.168.122.101;
```

## Appendix G—FAQs

1. Volumes on the EqualLogic storage array are not removed for cancelled sessions. This wastes storage space and consumes iSCSI connections.

Dell recommends that users manually clean up the unused volumes on the EqualLogic storage array and iSCSI connections after the session is canceled.

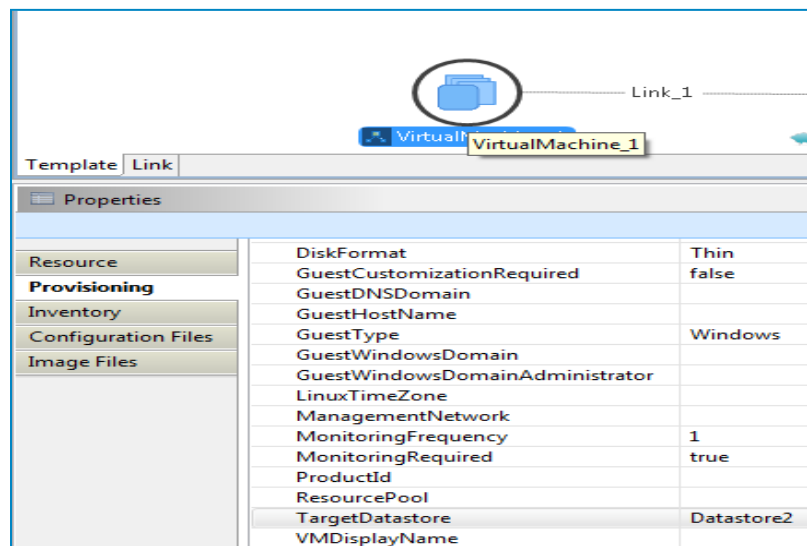
The orchestrations assume that Port Channel 2 is configured on the switches. If not, a failure will occur, indicated by red links on the session.

The list of port-channels is configurable, based on the environment. This list can be controlled by updating the portChannelList in the ssi.properties file under \$HOME/asm-galeforce/gf/common/integrations/Dell/Force10-S4810.

2. Where is the VM created? Is there way to specify which Datastore gets created?

Users can specify on which datastore the VM will be created by providing the value of TargetDatastore provisioning parameter of the VM in the template as shown in the screenshot below. If there is no value provided for TargetDatastore, the RA chooses the best available datastore for VM creation.

Figure 23. Provisioning Properties



Resource	Value
<b>Provisioning</b>	
DiskFormat	Thin
GuestCustomizationRequired	false
GuestDNSDomain	
GuestHostName	
GuestType	Windows
GuestWindowsDomain	
GuestWindowsDomainAdministrator	
LinuxTimeZone	
ManagementNetwork	
MonitoringFrequency	1
MonitoringRequired	true
ProductId	
ResourcePool	
<b>TargetDatastore</b>	<b>Datastore2</b>
VMDisplayName	

3. Is there a way to revert a template or import the original template?

The original templates are available on the appliance under folder \$HOME/DefaultTemplates.

Also as best practice:

- a. You should make a copy of the template and make the required modification in the cloned template.
- b. Keep the copy of the original templates by exporting them locally on a client machine and importing it back as needed.

4. Are SSI properties overwritten when upgrading the RA?

Yes upgrading the RA will override the ssi.properties file. As best practice, before upgrading the RA, backup RA directory by following the steps below:

1. Log into the Active System Manager server as “delladmin” user.
2. `cd $HOME/asm-galeforce/gf/common/integrations`
3. `cp -r <manufacturer>/<model> <manufacturer>/<model>_<CurrentDate>`

5. How is the Gold Volume on EqualLogic storage array secured?

The Gold Volume is secured by creating the access rights for the chap users.

To create the Gold Volume:

1. Create a volume of appropriate size on EqualLogic Storage array.
2. Associate the chap account and associate it with the newly created volume.
3. Connect to the management host and configure the newly created datastore.

6. What about iVimages and firmware released after this release of Active System Manager 7.1?

Images and firmware versions that are released after Active System Manager 7.1 should work but this should be validated with the solution.

7. What is base level configuration and what is consists of for Dell Force10 switches?

Base level configuration is the minimal set of configuration running on the switches so as to bring them to an operational state. Additional details of these configurations can be found in the embedded files.

8. Is it required to create pools on Dell EqualLogic storage array?

Creating pool is optional. If there are no user-defined pools on the EqualLogic Storage array, then a newly created volume becomes part of the default storage pool. Pools can be created by executing the **PoolCreate** method on the EqualLogic group object in the Operation Center View.

9. Is HTTPS supported for connecting to Active System Manager?

Yes, HTTPS is supported on Active System Manager.

10. Is terminal server connectivity required for Dell Force10 switches?

Terminal server connectivity to Dell Force10 switches is optional.

11. Does the default password of the Active System Manager appliance get updated?

The appliance login password can be changed. If the password is changed, software repositories that are configured on Active System Manager Appliance should be modified with the new password.

12. How would a user know what are the optional parameters in an orchestration step method?

Parameters with the \* sign suffixed in front of them are mandatory and the ones without \* sign are optional. See Figure 24 for example.

Figure 24. Parameters

Properties			
Template	Name	Value	Description
Global Parameters	▲ Compute		
	ServerProfileTemplate	AS200_VMware_template	Server Profile Template name
	ASMServerIPAddress		ASM Appliance IP address
	ImageName	san://ISO Bootable Images/esxi5.1...	ISO image path in repository
	ESXServerLicenseKey		License key for ESX host
	WorkloadBurstSize	1024	Burst Size for Workload Network
	WorkloadAverageBandwidth	1024	Average Bandwidth for Workload ...
	WorkloadPeakBandwidth	1024	Peak Bandwidth for Workload Net...
	BootType	VirtualMedia	Boot Media , ISO or PXE
	▲ Storage		
	StoragePoolName		Storage Pool name in EqualLogic S...
	DatastoreVolumeSize		Datastore size in EqualLogic Stroag...
	GoldDatastoreVolumeName		Gold Volume name where baseline...
	▲ vCenter		
	vCenterIPAddress		vCenter IP address
	vCenterDatacenter		Datacenter name where ESX host t...
	vCenterFolderName		Folder name where ESX host to be ...
vCenterClusterName		Cluster name where ESX host to be...	

13. If a customer is not going to use PXE deployments, are they still required to configure this?

PXE setup is optional if a customer is not going to use PXE deployment. They can use the ISO boot solution of Active System Manager 7.1

14. Do you want to show Hyper-V? These are all only VMware specific.

Active System Manager 7.1 supports VMware ESXi server imaging and workload provisioning for VMware VM. Microsoft Hyper-V is not supported with Active System Manager 7.1.

15. How do you change the hostname of the Active System Manager server?

To change hostname of the Active System Manager server:

- a. Log into the Active System Manager appliance as a root user.
- b. Open the `/etc/sysconfig/network` file and specify the new host name in the `HOSTNAME` field.
- c. Specify the host name in the `/etc/hosts` file.
- d. Run the `reboot` command to restart the server.
- e. Log into the server as a `delladmin` user after restarting the server.
- f. Run the `hostname` command to verify if the new host name is configured as host name.
- g. Stop the Active System Manager services.
- h. Change the directory using `cd $HOME/asm-galeforce/gf/sbin`
- i. Run `./updateHostName.sh` and follow the instructions to configure the host name in the Active System Manager installation.
- j. Delete the following files from the `/home/delladmin/directory`:
  - `.ssh/id_rsa`
  - `.ssh/id_rsa.pub`



- k. Create a password less connection using the command **ssh-keygen**.
- l. Start the Active System Manager Services. For details on starting and stopping the Active System Manager services, see the [Configuring Active System Manager Services](#) section.

16. While creating/editing the server profile template or attaching server profile to a server, can I select firmware files from different repositories?

No, selected firmware files must belong to a single repository. For example, if you choose iDRAC and BIOS firmware for update; both should be from the same repository.

17. Interface mapping (DIS links) between the end devices is not correct as they don't represent the actual location of the end devices.

Links discovered during discovery don't represent the actual connection between the end devices, those are dummy connections. The DIS links are discovered so that we could represent connection/links in the Active System Manager template. This allows scheduling of the Active System Manager templates with links in Active System Manager template.

18. The **Volume Create** step of the **AS200 Cluster - VMware ESXi 5.1 Hypervisor deployment ISO boot** template fails.

This issue is observed because there is a connection limit of seven simulation connections to EqualLogic. The connections include SSH, Telnet, and Web GUI connections. This limit is fixed and not adjustable.

Recommendation/Workaround:

- o There should be only four sessions running in parallel using an EqualLogic Storage Group.
- o If you want to provision a 32-blade cluster, then build the cluster using eight blades in each session. Do not initiate the session at the same time; schedule them sequentially and with the interval of 60 minutes.

19. The **MEM Configuration** step of the **AS200 Cluster - VMware ESXi 5.1 Hypervisor deployment ISO boot** template fails.

This issue is observed because there is a connection limit of seven simulation connections to EqualLogic. The connections include SSH, Telnet, and Web GUI connections. This limit is fixed and not adjustable.

Recommendation/Workaround:

- o There should be only four sessions running in parallel using an EqualLogic Storage Group.
- o If you want to provision a 32-blade cluster, then build the cluster using eight blades in each session. Do not initiate the session at the same time; schedule them sequentially and with the interval of 60 minutes.

20. Why are orchestrations failing on servers with dual SD cards?

If a server has dual SD cards, the BIOS setting must be set to mirror mode to avoid orchestration failures.

21. How do I increase the number of logical deployments that can run concurrently on the system?

For better performance of the individual sessions, the appliance has a default limit of 10 parallel actions. Logical sessions are long-running, so deploying more than 10 at a time will cause the system to queue up sessions greater than 10. This will also prevent other logical or virtual actions from being run until the logical jobs clear. If you need to run large batches of logical jobs, the SSH session limit can be increased to allow other actions to be performed while those jobs are running.

The SSH session limit for parallel execution is set to 10 by default on the appliance. However, the session limit can be configured based on your requirements and if you are facing bottlenecks because of it. Active System Manager has been validated with parallel executions. Therefore, to reduce the waiting time, it is recommended to set the thread pool size and parallel execution count to less than or equal to 50.

To change the Parallel SSH execution limit on the appliance to 50:

- a. Log in as delladmin user.
  - b. Open the `./common/etc` folder using the following command:  

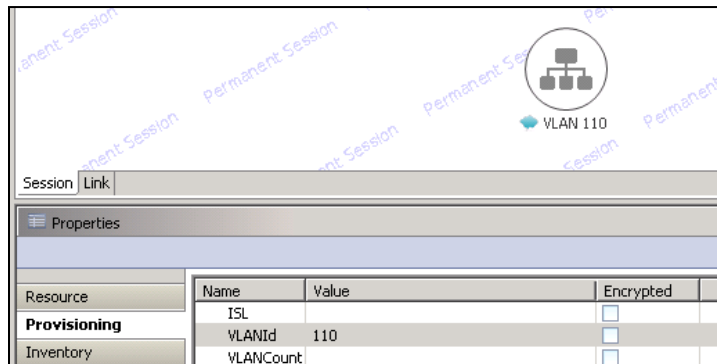
```
cd asm-galefore/gf/common/etc
```
  - c. Open the `remoteExecServer.xml` file and set the value for the following parameters to less than equal to 50:
    - Set `poolsize` - Attribute in the `threadpool` node
    - Set `executioncount` - Attribute in `maxparallel` node
  - d. Run the `reboot` command to restart the server.
22. Can I add new VLANs to a running physical session?

Yes, you can add new VLANs to a running session.

To add VLANs to a running session, perform the following steps:

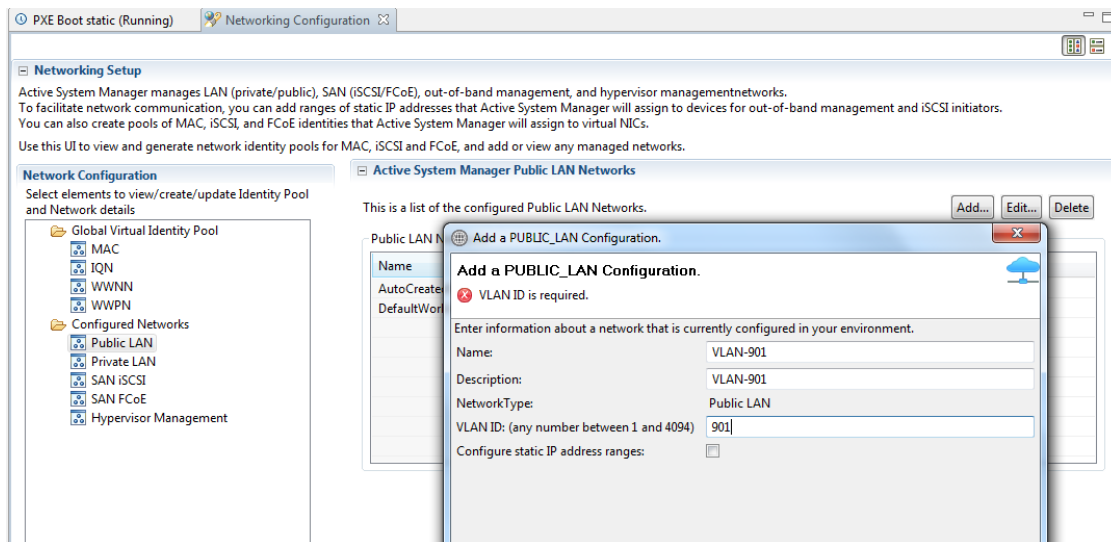
- a. From **Components** view, drag and drop a new VLAN component in a running session.
- b. Click **Save** in order to save the changes done to the running session.  
This step reserves a random VLAN ID from a range defined on the switch in the Active System Manager Inventory. To specify a specific VLAN ID, provide the value in the VLAN component as shown below:

Figure 25. VLAN ID



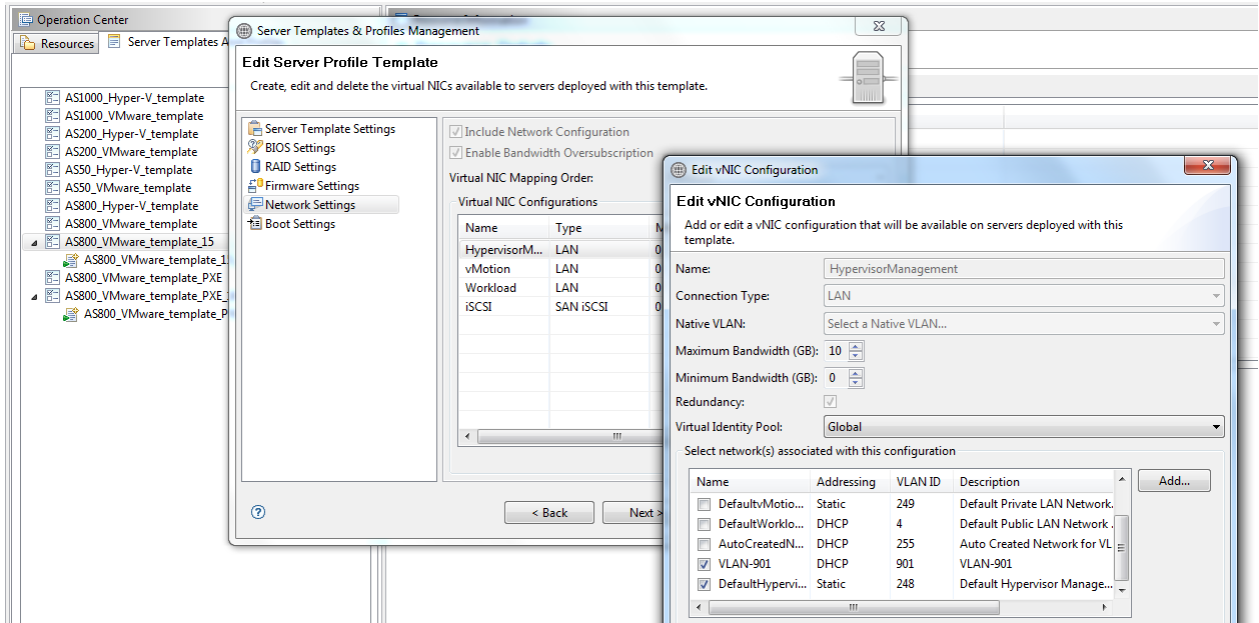
- c. From the link view in the running session, create the required links from the new VLAN component to the Dell Server instance and save the session. This step provisions the new VLANs on the switch.
- d. Add the new VLAN ID added in the running session manually to the list of Networks by going into the **Networking Configuration** tab available under **Setup**.

Figure 26. Add a PUBLIC\_LAN Configuration



- e. Update the Server Profile Template to incorporate the new VLAN ID.

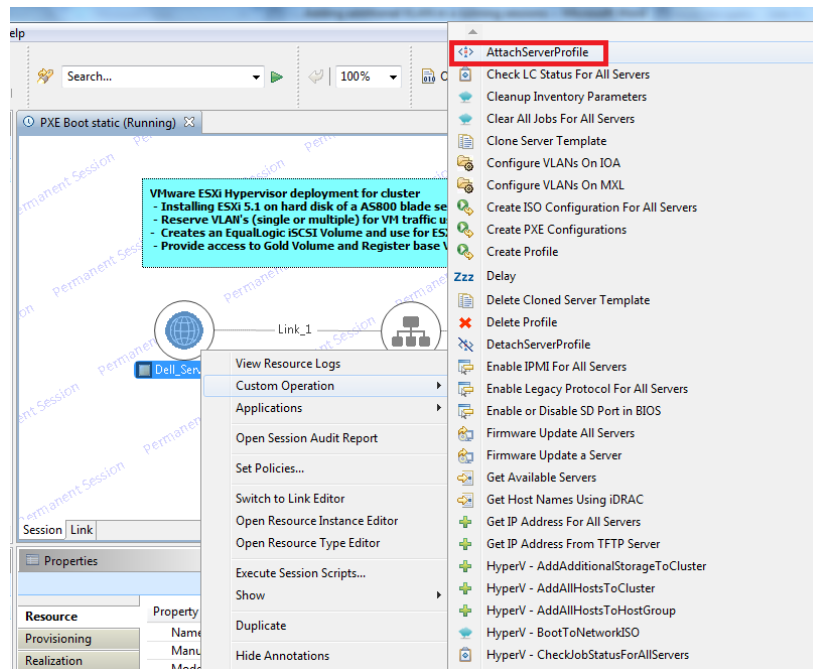
Figure 27. Edit vNIC Configuration



- f. Execute the custom operation **AttachServerProfile** with following parameters:
- Parameter **IOMsOnly** should be set to **true**
  - Parameter **ProfileIdList** should have the list of profile IDs in a comma separated format

This step provisions the new VLANs on the IOA.

Figure 28. Attach Server Profile



- g. Execute the Dell Server custom operation **VMware - Update ESXi Server Port Group VLAN Info** to configure the required port-groups on the vSwitch corresponding to new VLAN component in session.  
This step adds the new VLANs to the ESXi Host.